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THE

MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—10TH YEAR. SYDNEY: SATURDAY, MARCH 24, 1923. No. 12.

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THE INTRAVENOUS THERAPY OF RHEUMATOID ARTHRITIS.[1]

BY HENRY LAURIE, M.D.,
Honorary Physician, Alfred Hospital, Melbourne.

DURING the past eighteen months we have treated at the Alfred Hospital fifty-six patients with non-suppurative infective arthritis by means of intravenous injections of *Bacillus coli communis* vaccine. This is one form of what in medical literature of recent years has been called "non-specific intravenous protein therapy." This term, however, is not only cumbersome, but probably incorrect. Professor Nolf, who introduced peptone as a therapeutic agent eight or nine years ago, found that substances other than proteins caused an exactly similar reaction, including metals in colloidal form. He suggested that the reaction which followed the injection, was due to changes in the colloidal equilibrium of the blood. However this may be, it is well known that various substances—colloidal metals, peptone, milk or various preparations of milk, bacterial vaccines and so on—when injected, all give the clinical reaction in question.

Of these peptone has been almost universally used for this purpose in many and varied conditions from ununited fractures to epilepsy, as mentioned by Herbert French.[1] Peptone injections, however, are not without danger. Peptone as at present procurable is a variable product, containing various proportions of primary and secondary proteoses and a variable number of by-products of which, according to A. G. Auld,[2] the most important is histamine. The presence of this substance is probably responsible for the terms "protein shock" and "peptone shock," so often used to describe the reaction obtained.

Whole milk cannot be given intravenously, because of the danger of fat embolism. Thus various preparations containing casein have been prepared. Of these we have had no experience.

We have used "T.A.B." vaccine in all our cases of typhoid fever, as advocated by K. D. Fairley,[3] with excellent results.

BACILLUS COLI COMMUNIS VACCINE.

In our cases of arthritis, as well as in other cases, such as colitis, pyelitis *et cetera*, at the Alfred Hospital we have always used *Bacillus coli communis* vaccine. This is always procurable and is undoubtedly safe, provided certain precautions are observed. The only conditions in which I would hesitate to use it are pregnancy and the presence of

[1] Read at a meeting of the Victorian Branch of the British Medical Association on February 14, 1923.

actual cardiac failure. For a first injection the patient should be given an aperient the night before and a light diet on the day of injection, to minimize the nausea and vomiting which sometimes occur. The patient must be put to bed and kept there in charge of a nurse until the reaction is over.

Dose.

The initial dose should be not more than twenty-five million bacilli. In subsequent injections the dose should be increased. Our largest dose has been twelve hundred millions, though even in the same patient the intensity of the reaction is by no means commensurate with the dose employed. In many cases after large doses have been given, smaller doses have resulted in just as good reactions. If the patient has a definite toxæmia, which seems to modify and inhibit the reaction, a larger initial dose may be administered.

We always use a stock vaccine in which, as a rule, one minim (0.06 cubic centimetre) contains about ten million bacilli. This we inject undiluted, though it may be diluted with normal saline solution if preferred. Owing to the small bulk of the dose of undiluted vaccine, I personally use a tuberculin syringe which is graduated in minims and hundredths of a cubic centimetre. A fine, rather short needle is an advantage.

Technique.

The technique of the injection is simple. The bend of the elbow is prepared in the usual way with spirit and then lightly painted with tincture of iodine. A length of rubber tubing or even a handkerchief is applied above the elbow sufficiently tightly to distend the veins. This is secured in a way to be easily released. A prominent vein is chosen and the needle, attached to the syringe, already sterilized and charged with the required dose, is inserted into the vein. The piston is withdrawn slightly, a reflux of blood showing that the point of the needle is free in the vein. The tourniquet is then released and the contents of the syringe injected rapidly into the vein. No dressing is required. Care must be taken not to inject any air. For this reason a glass syringe is a necessity.

The Reaction.

The reaction of the human organism to this treatment is somewhat variable. The typical reaction which it is desired to obtain, is initiated in from a half to one hour after the injection by a sharp rigor lasting from twenty to thirty minutes. This is accompanied by a rise of temperature, reaching a maximum of 39.4° C. (103° F.) or even 40.6° C. (105° F.) or 41° C. (106° F.). This is followed by a rapid fall with profuse perspiration. Within twenty-four hours the temperature is normal or subnormal, even in patients who were febrile prior to the injection. The patient always complains of more or less headache, usually, however, of short duration. In many cases there is some nausea and vomiting.

Atypical reactions are often seen, the most common being those in which the reaction is a poor one, with slight nausea and headache, but with little or no rigor or rise of temperature. These often occur when least expected and are common in patients with distinct toxæmia. In some persons after a good reaction there is a delay in defervescence, the temperature not reaching normal until thirty-six or forty-eight hours after the injection. Again, there may be a double reaction on successive days, with, as a rule, a slight fall of temperature between. More rarely the reaction may be delayed for from eighteen to twenty-four hours. Atypical reactions are much more common after first injections, later reactions tending to conform to the typical. Some of these forms of reaction may be identified in the charts of the cases to be described later.

Coincident with the various clinical stages of the reaction—rigor, pyrexia, defervescence—cytological changes in the blood take place. A. E. Gow[4] gives the following account:

> The intravenous injection of *Bacillus coli* vaccine causes an almost immediate fall in the white blood cells. Following a first injection the retreat of the polymorphonuclears from the peripheral circulation is hurried and by the end of the first hour they may be outnumbered by the lymphocytes. A rapid increase follows the rigor and the maximum of twenty thousand to thirty thousand per cubic millimetre is reached in twenty-four hours; during the leucocytosis neutrophile myelocytes frequently appear and normoblasts have also been met with. The rise in the number of the circulating leucocytes is succeeded by a steady fall, the pre-injection figure being reached in approximately seventy-two hours. Though the fall in the lymphocytes is less abrupt, it is a very striking feature of the blood picture and of far longer duration than is the poly-nuclear leucopenia. It is not followed, however, by a lymphocytosis.

Dr. G. E. Foreman, our Resident Pathologist, has confirmed these observations and has carried on the work a step further. His notes are appended to this communication.

The Nature of Rheumatoid Arthritis.

Before discussing our results, it is necessary to define clearly what is meant by the term rheumatoid arthritis. Under the heading of *arthritis deformans* Osler and Macrae include what, in my opinion, are two separate conditions, one in which the synovial membranes and the peri-articular tissues and the second—osteo-arthritis—in which the cartilages and bones are primarily involved. For the former of these forms, for want of a better name, I have used the term rheumatoid arthritis, a name sanctioned by usage. As infection invariably plays an important rôle in the ætiology of these cases the term infective arthritis is often employed. This, however, would include suppurative and other forms of arthritis not included in rheumatoid arthritis. In the early stages of rheumatoid arthritis for varying periods there is no involvement of bone or cartilage beyond some loss of density of the heads of the bones adjacent to the affected joints. Later there is erosion of both bone and cartilage and later still outgrowths of bony substance in an effort of Nature to immobilize disorganized joints. In this chronic stage acute exacerbations are common. Rheumatoid arthritis usually has its beginning between the ages of twenty and forty.

On the other hand, the hypertrophic form—osteo-

arthritis—rarely, if ever, begins before the age of forty, is chronic from the onset, is never acute and, as a rule, steadily progresses. In a few of these cases we have found peri-articular and synovial involvement, probably due to a superadded rheumatoid condition. It is doubtful whether bacterial infection plays any part in an uncomplicated case of osteo-arthritis.

CLINICAL RESULTS OF VACCINE TREATMENT.

The table given below illustrates various points of interest in our series of fifty-six patients treated by the intravenous injection of *Bacillus coli communis* vaccine.

Acute Rheumatoid Arthritis.

In the acute group we have included in the first place those really acute cases of only a few days' duration (Case I.), and also others of somewhat longer duration, up to six weeks, with no bony changes or peri-articular fibrosis. Several of these patients were admitted with a provisional diagnosis of rheumatic fever and it was only when they failed to respond to large doses of sodium salicylate that a correct diagnosis was made. In all these patients the recovery from the attack was more or less rapid and complete and the patients were finally discharged without any disability. Three of them (see Case I.) required one injection only. The maximum number of injections was seven (Case II.), the average number being three and a half.

Case Records.

CASE I.—M.G., female, *ætatis* thirty-eight years, was admitted on March 28, 1922, with a provisional diagnosis of rheumatic fever. She complained of pain in various joints for the last four days. She had had frequent attacks of tonsillitis, one of which ushered in her present illness. The pain began in the right knee; then the ankles and wrist were attacked. It was severe in metacarpo-phalangeal joints. All joints were equally painful on admission. There was no swelling nor redness. The patient failed to respond to sodium salicylate (1.2 grammes = grains xx.) given every two hours.

On April 3, 1922, she received a vaccine containing 50,000,000 *Bacilli coli communis* intravenously. She was discharged free from pain on April 9, 1922.

CASE II.—S.W., a female, *ætatis* twenty-one years, was admitted on October 12, 1922. She had pyelitis in the latter months of pregnancy and had been treated at the ante-natal clinic at the Women's Hospital. At the time of admission her child was four months old. Three weeks after confinement she had pains in her knees and ankles; then the pains passed from joint to joint, nearly every joint being affected. She had been confined to bed almost

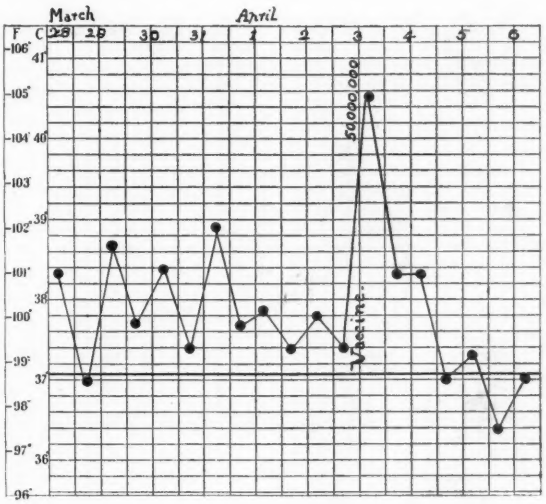

FIGURE I.—CASE I.

continuously for six weeks. Five days before admission she had had more severe pain, with swelling in one ankle, then in her shoulders, neck and wrists.

On admission there was pain and swelling in the wrists, shoulders and neck. The pain was slightly relieved by large doses of sodium salicylate, but her fingers became affected.

On October 15, 1922, she was given an injection of ten million *Bacilli coli communis*. On October 16 the pain in the joints was gone and the patient felt much better.

On October 17 she was given a second injection, the dose being twenty-five millions. On the following day the pain had disappeared.

On October 21, 1922, a third injection of fifty million bacilli was given. She was discharged on October 25, 1922, and instructed to attend for weekly injections.

On November 1, 1922, she received a further injection of fifty million bacilli.

She was admitted on November 6 with a subacute exacerbation. An intravenous injection of seventy-five million *Bacilli coli communis* was given at once. There was but slight relief on the following day. She was therefore given a further injection of one hundred million bacilli. Two days later she was much improved.

On November 11 she received a further injection of the same dose. On November 12 she was free from pain, with no limitation of movement.

The patient is now (February 14, 1923) in hospital with a quite different condition; all her joints are perfectly normal.

Subacute Rheumatoid Arthritis.

The subacute group includes two types of cases, those that begin insidiously, as many do, with no

Condition.	Patients.			Number of Injections.	Results.		
	Total.	Male.	Female.		Recovered.	Improved.	Not Improved.
Acute	15	4	11	52	15	0	0
Sub-Acute	11	5	6	78	8	3	0
Chronic	15	5	10	214	0	15	0
Very Chronic	8	4	4	76	0	7	1
Mon-Articular	5	4	1	38	0	2	3
Gonorrhœal	2	2	0	18	2	0	0
Total	56	24	32	476	25	27	4

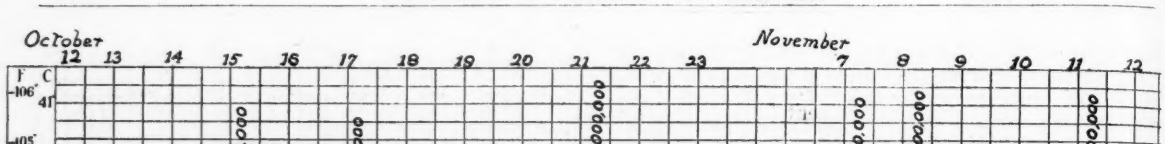

Figure II.—Case II.

acute stage and those which begin acutely, but subside, leaving more or less peri-articular thickening and limitation of movement, but still no discoverable bony changes. This was verified in several cases by skiagrams. Of the eleven cases in this group, eight cleared up entirely. Three patients could be classed as merely improved. In these pain was banished, but there remained a certain amount of stiffness of the joints with some limitation of movement due to persistent peri-articular fibrosis. In all, however, the range of movement was appreciably increased. An excellent example of this group is the following, one of my private patients.

Case Record.

Case III.—J.W.B., a male, *ætatis* forty-two years, sustained an injury to his right ankle eight years ago. He has had pain and stiffness in the right ankle for two years. Nine weeks ago his ankle became worse. His right wrist was first affected five weeks ago. Later his left ankle and both knees became acutely affected. He was kept in bed for four weeks. He has lost weight—six kilograms (nearly one stone)—in the last two months.

When first seen there was not much pain, but weakness, stiffness and tenderness of the right ankle and right wrist were present. On examination the right ankle was found to be much swollen and tender. The patient walked with a limp. His right wrist was much swollen and tender. His grip was almost absent. When seen on January 16, 1923, his temperature was 39.2° C. (99° F.).

On January 17, 1923, a vaccine containing twenty-five million *Bacilli coli communis* was injected at 3.15 p.m.. A rigor lasting twenty-five minutes occurred at 4 p.m.. Within half an hour of the cessation of the rigor he vowed that the pain and stiffness had gone from the wrist. He had a severe headache and vomited. On January 18 at 5 a.m. he had a slight rigor. The pain and stiffness were gone and the swelling in both the ankle and wrist was much less.

On January 19 a further injection of thirty million colon bacilli was given. This induced an ideal typical reaction with headache, but no vomiting. On January 20 the temperature was sub-normal after a profuse skin action.

On January 22 an injection of thirty million *Bacilli coli communis* was given. He then walked without limp. The grip of his right hand was strong.

Chronic Rheumatoid Arthritis.

The group of chronic cases contains fifteen patients in whom there was either fibrous ankylosis of joints or definite bony changes with, in addition, more or less acute or subacute synovial and peri-articular involvement. These all improved in so far as pain, stiffness and range of movement were concerned, the acute and subacute conditions clearing up. The bony changes and deformities, as was to be expected, were not visibly influenced by the treatment. The routine in these cases, as well as in the more resistant among the acute and subacute

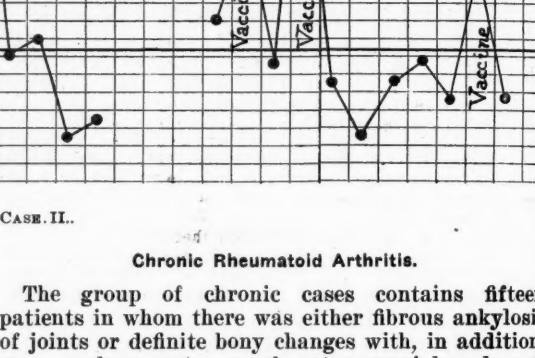

Figure III.—Case III.

cases, has been to give a preliminary series of injections. As soon as the patients were able to move about with comfort, they were sent home, but were required to return once a week for further injections, being kept in hospital on these occasions for one night only. Many of the patients who came in for weekly injection, reported an increasing period of freedom from pain after each injection—at first one, two or three days, until later there was entire freedom from pain for the whole week. In the chronic cases an average of fourteen injections were given as against seven in the subacute cases.

The two following examples of this group illustrate in the first case a very long history—six years—with a minimum of actual deformity and in the second case a comparatively short history—twelve months—with more evident structural changes:

CASE IV.—R.S., a female, *ætatis* thirty-five years, had been seized six years ago with a sudden attack of pain and swelling in the ankles, with malaise. This attack lasted for twelve months. Later the knees, fingers and several other joints became involved. This joint disability has been present continuously since; she has suffered more severe exacerbations from time to time.

On examination it was noted that there was some spindle swelling of proximal joints of the fingers. There was definite peri-articular and synovial swelling, with some fibrosis of the right knee. The left knee was less severely affected. Both knees had some flexion deformity.

On November 28, 1922, she was given a vaccine containing twenty-five million colon bacilli. This was followed by a mild reaction with nausea, but no rigor. On November 29 there was a secondary rise of temperature.

On November 30 a further injection of forty million bacilli was given. There was a good reaction.

On December 2 a third injection was given, sixty million bacilli being given. There was no pain in the joints on December 4. The knees could be almost fully extended.

On December 6 she received another injection of seventy-five million bacilli and was discharged on the following day. She attended the hospital for several further injections at weekly intervals.

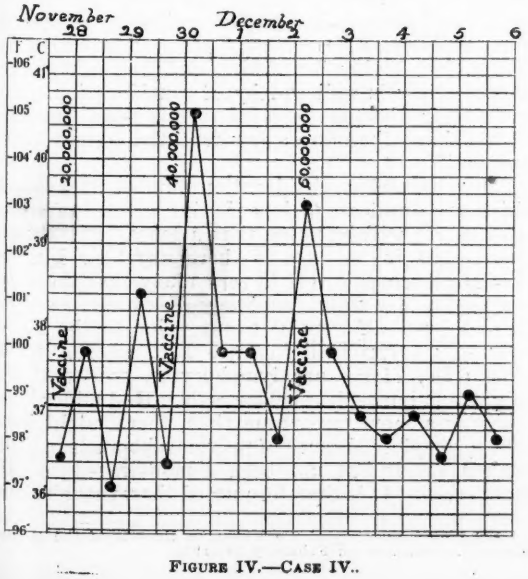

FIGURE IV.—CASE IV..

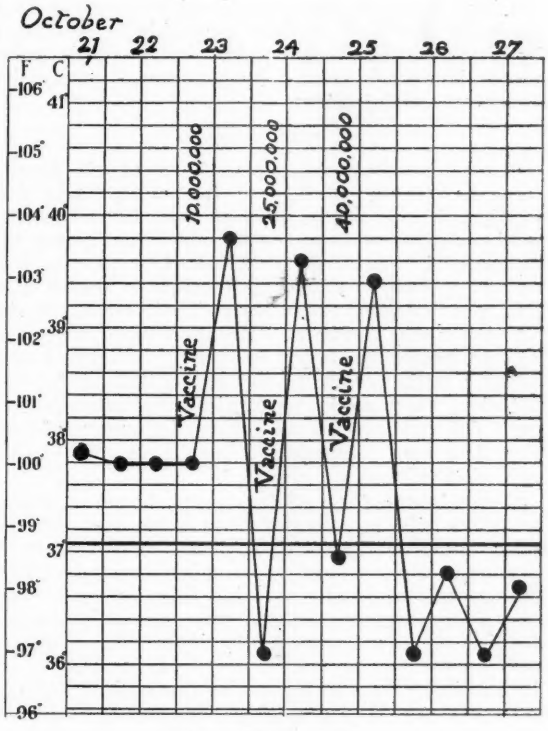

FIGURE V.—CASE V..

CASE V.—A.B., a male, *ætatis* fifty-six years, had had pain in his smaller joints during the last twelve months, with occasional swelling. This had become worse in the last six months, affecting first the fingers, then the wrists, feet and later the knees. He had been practically crippled for the last six weeks. He has lost weight.

On October 21, 1922, the metacarpo-phalangeal joints of his fingers were enlarged and swollen, with some abduction deformity. There was much creaking and limitation of movement. In both knees there was peri-articular and bony thickening, with creaking, but very little limitation of movement. The temperature was 37.8° C. (100° F.).

On November 23, 1922, the first coli communis vaccine was injected, the dose being ten million bacilli. On November 24 the pain was not improved. A second injection of twenty-five million bacilli was given. On November 25 the joints were still painful. The third injection was given of forty million bacilli. On the following day he felt much easier. On November 31 sixty million coli bacilli were injected. He was able to walk on December 2, 1922, and was discharged on the same day. He has had several injections subsequently at weekly intervals with continued improvement.

Very Chronic Rheumatoid Arthritis.

The very chronic group includes eight patients with fibrous ankylosis of joints and bony deformities in whom little improvement was possible. In only one of these, however, could we say that there was no improvement.

Other Forms of Arthritis.

Possibly the mon-articular cases should not have been included in this series. In these there is always bony involvement from the beginning. They belong rather to the osteo-arthritis division. We have used the intravenous method of treatment in a few cases of uncomplicated osteo-arthritis with little or no result.

I have included the gonorrhœal cases more as a reminder that they are very amenable to treatment by this method, improvement being much more rapid than when treated by gonococcal vaccine by subcutaneous injection.

DISCUSSION.

From the above histories, shorn of all details irrelevant to the method of treatment under discussion, it must not be inferred that old and proved methods were not employed when they were required. The rapid results obtained by this method do not relieve us of our obligation to search diligently for possible foci of infection in teeth, tonsils, nasal sinuses, uterus and its appendages and elsewhere. If such be found, they must be treated adequately with a view to the prevention of further attacks. Then, again, mechanical appliances to correct deformities are necessary in many of the chronic cases. Massage and hot air are also of considerable value.

There is one form of treatment, however, which we think will be superseded in these cases by the intravenous method and that is the use of autogenous vaccines administered subcutaneously. Vaccine treatment in the past has been in most cases very disappointing. In many cases it is impossible to discover any focus of infection. Even when an autogenous vaccine can be prepared, in many cases its administration in increasing doses gives little or no reaction. It presumably does not contain the causative organism. At times a large dose of an autogenous vaccine is given, in view of previous disappointments, and an intense reaction follows, with marked focal exacerbations of pain and swelling in the affected joints. As this subsides the treatment is continued; even in these circumstances the final results are not always perfect, even in acute cases. Contrast this with the results of treatment by the intravenous injection of *Bacillus coli communis* vaccine.

In not one of our patients was there any increase of pain, unless occasionally and temporarily during the rigor, but soon afterwards and certainly within twenty-four hours in all but the most chronic cases, there was distinct amelioration, if not absence, of pain. Our results were also obtained much more rapidly than was ever seen by the old method.

Prior to the initiation of this treatment, patients suffering from rheumatoid arthritis were not enthusiastically welcomed in the beds of the hospital, as their stay was always prolonged far beyond the average period. Now at the Alfred Hospital all that is changed. The stay in hospital for a preliminary series of injections is always comparatively short, usually only a few days; and in the case of patients who return for subsequent weekly injections, the detention is for one night only.

In support of the safety of the treatment, I need only point out that in this series four hundred and seventy-six injections were given and in only one case were there any alarming symptoms. In this case there were cyanosis and dyspnœa at the height of the reaction. The patient was relieved of his arthritis, but died several weeks later of uræmia. Old age is no contra-indication. Our oldest patient was seventy-seven years of age and was crippled and had been confined to bed for some weeks. She was put on to her feet again and is still well.

I have not attempted to discuss the many problems that this treatment suggests. As to its mode of action in the present state of our knowledge, all we can say is, as Peterson[5] expresses it: "That this method is purely one of stimulation whereby the forces of cellular and humoral resistance are for a short time keyed up to the very highest pitch."

In conclusion, I desire to thank my colleagues, especially Drs. Anderson and Mackeddie, for their permission to make use of cases under their care; also the resident staff of the Alfred Hospital for their enthusiasm in carrying out the treatment and for their assistance in classifying the cases, especially our Resident Pathologist, Dr. G. E. Foreman, for his valuable observations upon the blood changes which occur as a result of the reaction.

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NOTES ON THE BEHAVIOUR OF THE WHITE BLOOD CORPUSCLES AFTER INTRAVENOUS BACILLUS COLI COMMUNIS THERAPY.[1]

BY G. E. FOREMAN, M.B., B.S.,
Resident Pathologist, Alfred Hospital, Melbourne.

THIS is by no means an exhaustive paper and must be regarded as being merely an introduction to the study of the behaviour of the white corpuscles after the administration of the dead culture of *Bacilli coli communis*, but the uniformity of results is so striking as to render further observation on this subject highly interesting and a more comprehensive study is well worthy of consideration. Unfortunately, the time allotted to this work has been all too short, therefore a few tentative suppositions must suffice.

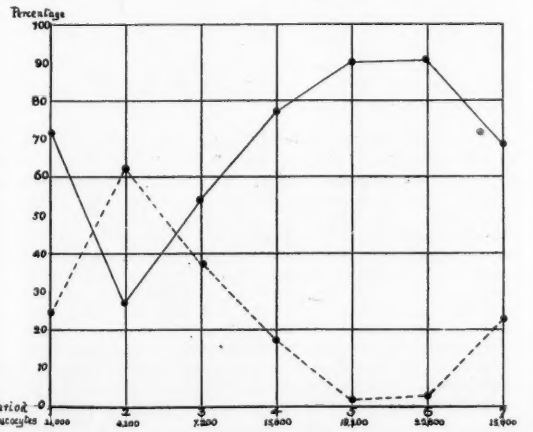
The cases under consideration number five, two of which are duplicated, thus making a total of seven records. It will be noted that a leucopenia always occurs, but in no case is there anything like an absolute leucopenia. It is very likely that the polymorpho-nuclear cells completely disappear, as is indicated by a differential count prior to the rigor, strikingly exemplified in Case III., where, out of 4,800 cells, 71.5% are lymphocytes, whilst 12.5% only are polymorpho-nuclear cells. Had slides been taken at a more opportune time, there might have been a complete absence of polymorpho-nuclear cells. Such a result has not been demonstrated in this short series. It is therefore noted that, though there

[1] Read at a meeting of the Victorian Branch of the British Medical Association on February 14, 1923.

is always a decrease in the number of white blood corpuscles after injection, there is never a complete absence: there is a relative lymphocytosis. This fluctuation in the leucocyte count is well shown in Graph I.. This graph may be utilized also to demonstrate what is meant by a relative lymphocytosis. It is noted that in the time interval between the injections and the reaction there is a fall in the curve of polymorpho-nuclear cells and a compensatory rise in that of the lymphocytes. In this small series of cases the lowest leucocyte count has invariably been prior to the rigor. Following up this graph, it is noticed that after the reaction there is a gradual rise in the percentage of polymorpho-nuclear cells, with a decrease in the lymphocytes. These changes have been observed in all the cases under review, though not all in so marked degree as the present chart indicates. The graphs shown are certainly those which depict the greatest variations for purposes of demonstration, but, nevertheless, all cases show these changes.

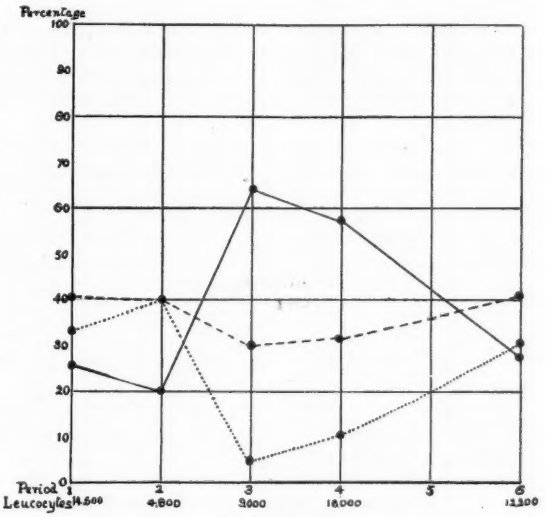
There is considerable doubt as to the time factor in localizing this absence of polymorpho-nuclear cells, but it seems probable that this takes place some time between the injection and the appearance of the reaction (as indicated by the onset of a rigor and pyrexia). One of the main reasons for this contention is that, even at an early stage subsequent to the onset of a rigor, a differential count demonstrates an increase in the number of polymorpho-nuclear cells with one or two nuclei. These, we assume, are the product of increased bone marrow activity. In other words, the rigor is the effect of the leucopenia and not the cause. Other arguments may be used to enforce this belief.

The pyrexia occurs subsequently to the rigor, if there is one. In all cases, however, there is a pyrexia. This shows that there are some substances liberated which act on the thermic factors. It is possible that the same substances which act in this manner, have an influence on the production of the rigor, for there appears to be more than a superficial relationship between (*a*) the height of the



GRAPH I.

Leucocyte Curves (Case I.). Continuous Line: Polymorpho-nuclear Neutrophile cells. Interrupted Line: Lymphocytes (large and small).



GRAPH II..

Arneth Count (Case VI.). Continuous Line: One or two nuclei. Interrupted Line: Three nuclei. Dotted Line: Four or more nuclei.

pyrexia, (*b*) the degree of reaction and (*c*) the amount of injected culture. In this connexion it is noted that of the seven patients, five had rigors after injection; in the two who did not react in this manner, subsequent injections of increased strength were succeeded by intense reactions—rigor and high pyrexia. This rise in temperature occurs concomitantly with the leucocytosis.

The ultimate leucocytosis seems to be invariably higher than the original leucocyte count.

Graph I. does not show a very great increase in this respect, but as twelve hours elapsed between the sixth and the seventh period, it is possible that there may have been a further increase in the leucocyte count in this interval. Another interesting observation in those cases in which there is a high initial white blood corpuscle count, seems to be that the leucocytosis as measured on the day following the reaction seems always to have decreased.

What is the fate of the polymorpho-nuclear cells when they disappear from the blood stream? It is probable that by absorption of the bacilli with their toxins they are disintegrated very soon after the injection. This seems to be borne out by the fact that the films examined after the rigor show a large proportion of degenerating polymorpho-nuclear cells. The same changes were seen in all cases, namely, protoplasmic swelling, somewhat indefinite cell outline and signs of definite nuclear disintegration.

An Arneth count in this connexion is interesting (see Graph II.).

Of the 14,600 leucocytes prior to the rigor, the polymorpho-nuclear cells with one or two nuclei equal 25.8%, those with four or more nuclei 33.6% and those with three nuclei 40.5%.

At the time of the rigor there is little appreciable difference in these figures, but one hour later, when the number of white blood corpuscles per cubic millimetre was 9,000, there was a great increase in

the cells with one or two nuclei—up to 64.3%—with a corresponding decrease in those with four or more nuclei, this figure being 5%. The figure for the trilobed nucleated polymorpho-nuclear cells was little altered.

The condition of affairs remains somewhat similar for a while, until the day following the injection it is seen that the percentage count approaches closely that prior to the injection. This state of affairs invariably happens, even though the contrast is not always so marked as in the case under discussion. One always obtains a general impression that there is an increased percentage of immature cells to be seen following the rigor or reaction. As before remarked, these differences become the more pronounced the greater the reaction.

It might reasonably be assumed, therefore, that the effect of injections of *Bacilli coli communis*, as shown by a study of the blood cells, are:

(*i.*) A diminution of polymorpho-nuclear cells.

(*ii.*) A consequent reaction in the shape of a leucocytosis, the predominant cells being of an embryonic type. This suggests a rapid response by the hæmatopoietic system to the introduction of *Bacillus coli communis* emulsion into the blood stream.

In conclusion, let me thank Dr. A. J. Trinca for his valuable help and also the staff of the X-ray department of the Alfred Hospital for their assistance in the preparation of the lantern slides.

THE DIAGNOSIS OF PULMONARY SYPHILIS.

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A CERTAIN number of sera from patients suspected of having a pulmonary hydatid either on clinical grounds or on X-ray findings have been sent to the Institute for the complement-fixation test for hydatid, which have shown no reaction in the presence of hydatid fluid (antigen), but have given a (positive) reaction to the Wassermann test.

The Clinical Manifestations of Primary Syphilis.

We must recognize first of all that a hydatid may be present and the patient's serum may show no complement-fixation reaction. The conditions under which such a result may be obtained, were stated by Hamilton Fairley[1] to be (*i.*) lack of antigen production, owing to inherent incapacity of the parasite to produce antigen or, more frequently, owing to degeneration of the cyst contents, (*ii.*) non-absorption of antigen from the cyst, owing to non-leakage of its contents, as with young cysts and young people, (*iii.*) inability on the part of the patient to produce antibody (amboceptor).

The serum from a patient under the care of Dr. Gordon Shaw, with signs suspicious of a pulmonary hydatid, showed no reaction to the complement-fixation test for hydatid, but a reaction to the Wassermann test. At operation an old atrophic and degenerated hydatid cyst was found. In this instance a hydatid was present in a syphilitic patient and the hydatid complement-fixation reaction was absent on account of the lack of antigen in the degenerated cyst.

Excluding instances such as that quoted, in which hydatid is present, although it is not picked up with the complement-fixation test, we are left with a series of cases in which, in the presence of lung signs suggestive to the clinician and radiologist of hydatid, a Wassermann reaction is obtained when a complement-fixation reaction with the hydatid test was expected.

Probably the most frequent manifestation of intra-thoracic syphilis is aneurysm of the aorta and this was the underlying condition in three cases of the series, the history of one of which is as follows:

M., forty-eight years of age, was admitted to the Alfred Hospital in April, 1921, with the provisional diagnosis of mediastinal tumour. Hydatid was regarded as possibly present. His serum gave no reaction to the hydatid test, but reacted with the Wassermann test. The clinical report was: "Signs suspicious, but not definitely those of aneurysm." The diagnosis of aneurysm was confirmed at X-ray examination on re-admission to hospital one year later.

In this patient the signs were those of involvement of the mediastinum, but in many others the patient's symptoms and signs pointed to disease of the lung substance and the question of pulmonary syphilis had to be considered.

Two problems emerge from these observations: first, what is the pathological basis of the signs which thus confuse the clinician and radiologist, and, second, can syphilis of the lung be differentiated as a recognizable clinical entity? In the following paper we have analysed the clinical data of thirty-two patients and have collected together observations on patients in the Melbourne Hospital coming to *post mortem* examination in whom lung changes possibly due to syphilitic infection are found.

The following cases are reported as examples of pulmonary syphilis verified at *post mortem* examination:

M., aged fifty-two years, had had bronchitis in camp three years before admission to hospital and had suffered from dyspnœa for the past two years, latterly amounting to orthopnœa, and some loss of weight. He had had hæmoptysis on several occasions and severe pain in the left side for three weeks. He was observed to be somewhat cyanosed and there was slight clubbing of the fingers. His lungs were dull at both bases, the breath sounds were increased on the right side and a patch of tubular breathing was found at the base of the left lung, with some crepitations. No X-ray examination was made. No tubercle bacilli were found in the sputum and the serum reacted with the Wassermann test. The clinical diagnosis was bronchitis and pneumonia, with possibly an underlying aneurysm. The patient died suddenly in a dyspnœic attack four days after admission to hospital. At the *post mortem* examination there were dense, wide-spread adhesions and pleural thickening on the right side. The left lung in its lower lobe showed a superficial, pale, fibrous part in which were large dilated bronchi with congested mucous membrane. Towards the hilus there were several hard yellow gummata, most obvious round the hilus, but spreading in scattered areas outwards. The bronchial glands were not enlarged (see Figure I.).

This patient's affection represents a type of pulmonary syphilis characterized mainly by symptoms of asthma and bronchitis, which later became so severe as to simulate an intra-thoracic tumour.

A second case may be cited of a type of pulmona-

syphilis which rather tended to simulate tuberculosis:

M., aged fifty-six years, had had constant cough for some time, which had become much worse during the previous three weeks; on his admission it was accompanied by extreme cyanosis and dyspnœa and swelling of the feet and legs. Examination revealed dulness at both apices and in the left axilla, with bronchial breathing and loud rhonchi all over the chest. No X-ray examination was made. The condition was regarded clinically as bronchiectasis with a tuberculous basis. At autopsy there were patchy dense adhesions of the pleura and one large area of bronchiectasis; the dilated tubes were engorged and embedded in pigmented fibrous tissue. There was no trace of tuberculosis. The heart showed gummatous infiltration and the liver a small calcified gumma, so that the fibrosis of the lungs in this case was probably of a syphilitic nature.

In yet a third type of pulmonary syphilis, no symptoms of lung disease had presented themselves during life and lesions were found at autopsy:

M., aged forty-two years, had been an out-patient suffering from "rheumatics" of the knee for two or three months before he was admitted to hospital on account of severe hæmatemesis for the previous thirty-six hours. Vomiting of blood continued until his death four days later. At the *post mortem* examination gummata were found in the testes and patchy fibrosis in the pancreatic region involving the portal vessels and bile duct. The left lung showed dense pleural adhesions and fibrosis of the lung, with interlacing fibrous bands containing gummata (see Figure II.).

M., aged forty-four years, was admitted to hospital on account of heart failure and melæna of two weeks' duration. He complained of cough and shortness of breath. His temperature was normal and his systolic blood pressure 160 millimetres of mercury. The chest findings were dulness and diminished breath sounds at both bases, due to fluid. The report of X-ray examination was: "Some elongation of aorta with slight rotation of heart." The fluid was withdrawn and he left hospital relieved, to return in three weeks with the same symptoms which led to his death. The whole duration of his illness was two months. At autopsy there was wide-spread syphilitic aortitis and at the apex of the right lung a scar containing a gumma just visible to the naked eye (see Figure III.).

FIGURE I..
Lower Lobe of Left Lung. *a* = Dense fibrous tissue containing gummata. *b* = Dilated bronchus.

FIGURE II..
Fibrosis of Lung (syphilitic), showing strands of interlacing fibrous tissue containing gummata.

One of the established criteria of a syphilitic affection is the therapeutic test, the improvement in the local manifestations and the general condition of the patient after the administration of antisyphilitic remedies. The following is an instance in which the clinical diagnosis of pulmonary syphilis was supported by the benefit resulting from antispecific treatment:

F., aged sixteen years, had had pneumonia twice and frequent colds and a chronic suppurative *otitis media*. She had a chronic cough, with recurring attacks of slight hæmoptysis. She easily got out of breath on exertion and had night sweats. She lost weight with each exacerbation of symptoms. She was a thin, undersized girl, the left side of whose chest was uniformly dull and presented bronchial breathing all over with a cavernous type of breathing in the upper lobe. On the right side there was compensatory breathing. Her serum reacted with the Wassermann test, as did that of her mother. No tubercle bacilli was found in the sputum, although careful search was made on several occasions. The radiologist reported a general irregular dulness of the left lung, which was collapsed, with cavitation in the external scapular region; emphysema on the right side. She has been under treatment with iodides and mercury and considerable improvement in her general health has followed.

Pathology of Pulmonary Syphilis.

The crucial method of proving the syphilitic nature of a pathological process in the lung, as

elsewhere, is by demonstrating the presence of the *Spirochæta pallida* in the lesion. This we have not succeeded in doing. The gumma has long been recognized as syphilitic in nature. General fibrosis of the lungs, accompanied by fibrosis of other organs—liver, spleen, kidneys—may be due to syphilis, but other conditions also may terminate in fibrosis. Warthin[2] insists that the essential lesion of syphilis is not the gumma, but lymphocytic and plasma cell infiltration of the peri-vascular lymph spaces, followed later by fibrosis (see Figure IV.).

We have studied the lungs in a series of cases, either in which the Wassermann reaction was known to be positive or in which other organs, for example, the aorta, showed lesions characteristic of syphilis; in the latter the Wassermann test was applied in the majority of instances on the serum taken at autopsy. It was impossible to examine microscopically the whole of the lungs; but sections were taken of different portions and records were made of the appearances of the pleura and its vessels, of the alveolar walls and contents, of the condition of the bronchi and the peri-bronchial connective tissue and of the state of the vessels. Our observations were made on a series of eighteen patients and the findings were as follows:

Table I..

Condition.	Number.
1. Pleural adhesions localized to apex	5
2. Pleural adhesions scattered over lungs	4
3. Fibrosis with scarring	7
4. Gumma	6
5. Broncho-pneumonia only	1
6. Infarct	1
7. Definite tuberculosis	3

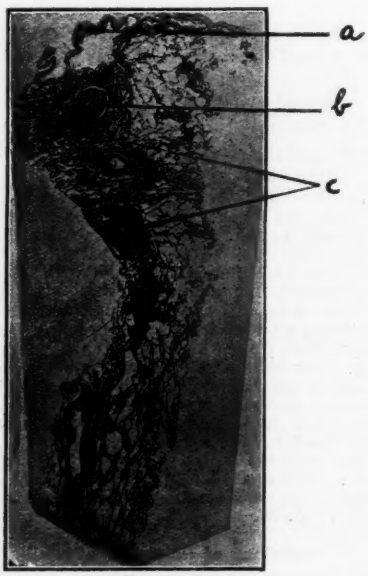

Figure III..
Small Gumma in Apex of Lung. *a* = Pleura. *b* = Small gumma in a sub-pleural scar. (*c*).

Figure IV..
Typical Syphilitic Small Round-Celled Infiltration and Fibrosis.

Adhesions at Apex.

In one of the five there is a definite connexion between the thickened pleura and a small but well-defined gumma, showing the classical three zones—central caseous, intermediate fibro-cellular with new capillaries and outer cellular (see Figures III. and V.). The pleura is moderately thickened and shows the fibro-cellular character of a syphilitic lesion (Warthin); the pleura is more vascular than normal and the vessels show increase in adventitial fibrous tissue and active endothelium. The vessels in the lung itself show considerable increase of peri-vascular tissue and some intimal thickening.

In another there is peri-vascular and peri-bronchial fibrosis, chronic and gross (see Figure VI.), and pleural thickening with cellular and fibroblastic infiltration, from which strands of fibrous tissue extend into the lung.

Two show round-celled infiltration and fibrous areas, some sclerosis of vessels and peri-bronchial infiltration and fibrosis. In one there is also a fibroblastic and fibrous condition of the alveolar walls, which, where the fibrosis is complete, are quite devoid of blood vessels (see Figure VII.). It resembles the condition of the alveolar walls occurring in "white pneumonia" of children.

The fibrous tissue always contains a considerable amount of pigment.

Gumma.

The six gummata include two of microscopic size, with typical structure, situated in the peri-vascular fibrous tissue of the lung (see Figure VIII.). In one of these the pleura is adherent and fibrous strands extend into the lung substance. A third is situated in an apical scar and has already been referred to (see Figures III. and V.). A fourth specimen showed at the base of the right lung one large gumma and several small ones, fleshy caseous and sharply defined, with no blurring of the edges and no surrounding fibrosis, although there were also firm pleural adhesions over the lower lobe of the lung. In the fifth, gummata of varying sizes are present near the hilus of the left lung, associated with marked fibrosis, dilated bronchi and dense pleural adhesions (see Figure I.). In the sixth

FIGURE V..
High-Power Microphotograph of *b* in Figure III..

there were patchy old adhesions on the right side. The left lung showed almost general adhesions, especially dense at the base; it contained two small, sharply defined, caseating gummata, with lines of peri-vascular fibrosis (see Figure II.).

In one instance, therefore, the gummata were found in a mass of fibrous tissue originating in the peri-bronchial tissue of the hilus; in three the gummata were situated in the lung substance, while in two others typical syphilitic changes occurred in a scar at the apex of the lung. This latter may be the pathological condition underlying the syphilitic

FIGURE VI..
a = Bronchus Embedded in Dense Fibrous Tissue.

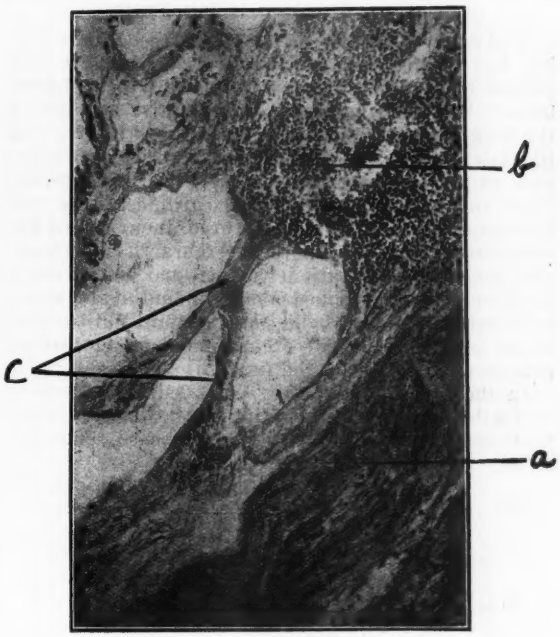

FIGURE VII..
High-Power Microphotograph, showing *a*, Peri-bronchial Fibrous Tissue; *b*, Lymphocytic Infiltration; *c*, Fibrosis of the Alveolar Walls.

infection of the apices of the lungs, simulating early pulmonary tuberculosis, described clinically by Landis and Lewis.[3]

Tuberculosis.

Three patients with positive Wassermann reaction showed undoubted tuberculosis. We are now engaged in a study of the relation of syphilis to phthisis, which will be reported later.

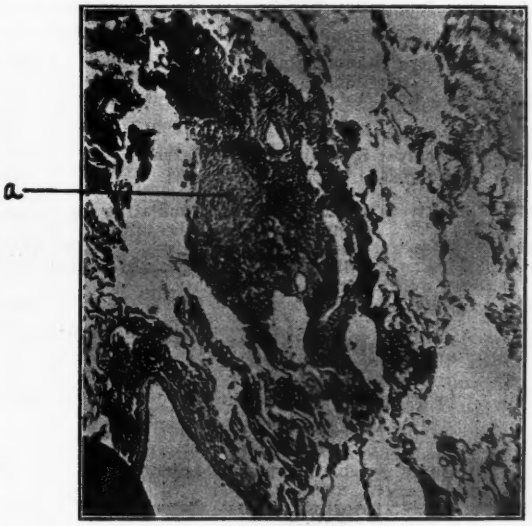

FIGURE VIII..
High-Power Microphotograph, showing *a*, Small Gumma Situated in Peri-Vascular Fibrous Tissue.

Signs and Symptoms in this Series.

A primary pulmonary lesion was recognized during life in five patients, in two of whom it was proved to be tuberculous, with possibly a syphilitic basis. In three the lesion was definite syphilis of the lung, with sufficiently gross changes to give rise to clinical signs. In seven others the clinical course and cause of death were suggestive of syphilis. Thus, in five aortic disease and cardiac failure was the cause of death, in one ruptured aneurysm of the abdominal aorta, in another cerebral hæmorrhage. The lungs of these patients manifested one or other of the changes described above, including localized and scattered pleural adhesions, general fibrosis and in the one who died of cerebral hæmorrhage, tuberculosis was present in the lungs.

In the remainder of this series (six), the causes of death were varied, including cirrhosis of the liver with ascites, uterine malignant disease, subacute nephritis and prostatic enlargement. In all of these it was the *post mortem* appearance which suggested syphilitic change in the lungs; the Wassermann test was positive in five, but was not done in the other. One showed definite gummata and irregular adhesions; in two others, no syphilitic changes were found microscopically; in the three others, microscopic examination showed undoubted syphilitic change.

From this series, in which *post mortem* examination was made, it is seen that syphilis does cause changes of various degrees in the lungs in a considerable number of cases, but only when these are quite gross does it cause pulmonary symptoms during life.

Table II. gives short details of this series of *post mortem* observations. The classification of the clinical type of syphilis is expanded in the next part of this paper.

Table II.—Post-Mortem Series.

No.	Wassermann Test.	Cause of Death.	Syphilis of Lung.		Other *Post Mortem* Findings.
			Clinical Type.	*Post Mortem* Evidence.	
1.	+++	Aortitis, myocardial failure	Latent	Small gumma, some pleural thickening and cellular infiltration; peri-bronchial fibrosis	———
2.	+++	Pulmonary tuberculosis	Nil	Nil	Tubercle bacilli and giant cell system
3.	+++	Aortitis, cardiac failure	Latent	Peri-vascular and peri-bronchial fibrosis	———
4.	+	Uterine malignant disease, sepsis	Latent	Peri-vascular and peri-bronchial fibrosis, round cell infiltration of pleura, fibrous alveolar walls	———
5.	Positive	Pulmonary syphilis	Asthma, neoplasm	Advanced gummatous change and fibrosis	———
6.	+++	Nephritis, heart failure	Latent	Scattered adhesions of pleura; strands of very vascular fibrous tissue extending outwards from hilus	———
7.	Positive	Cirrhosis of liver	Latent	Dense adhesions over right lower lobe, which contained several gummata	———
8.	Not done	Bronchiectasis	Simulating tuberculosis	Fibrosis, bronchiectasis	Gummata of heart and liver
9.	Positive	Aneurysm of abdominal aorta	Latent	Thickening of pleura, fibrosis of lung	———
10.	+++	Adenoma of prostate	Latent	Scattered pleural adhesions; scar in right middle lobe; peri-vascular gummatous changes	———
11.	Strongly Positive	Syphilitic aortitis, aortic regurgitation	Latent	General fibrosis; no definite microscopic changes	———
12.	Positive	Broncho-pneumonia	Simulating tuberculosis	General fibrosis; gummata of left lower lobe	———
13.	+++	Œsophageal malignant disease	Nil	Nil	Broncho-pneumonia
14.	+++	Subacute nephritis	Nil	Doubtful activity of endothelium of blood vessels	Infarct
15.	+++	Hydatid disease and tuberculosis[1]	Nil	Nil	Tuberculosis of lung
16.	+++	Pulmonary tuberculosis; cerebral hæmorrhage	Nil	Fibrous reaction around tubercles	Tuberculosis of lung
17.	+++	Lobar pneumonia	Latent	Cellular infiltration of pleural scar at apex	———
18.	+++	Aortitis, heart failure	Latent	Peri-vascular gumma microscopically	Aortitis

[1] Also reacted to the hydatid complement fixation test.

Before the advent of bacteriology as an aid, the clinical diagnosis of syphilis of the lung, "syphilitic phthisis," was fairly frequent. This view is reflected in our own literature in the writings of S. Dougan Bird, 1867,[4] who states that "cases of pulmonary syphilis are not at all uncommon here."

After the discovery of the *Bacillus tuberculosis*, a reaction occurred; and Fowler in 1898[5] found in the museums of the London hospitals and of the Royal College of Surgeons, only ten specimens which could be accepted as illustrating syphilitic disease of the lungs. None of these specimens was from a case of congenital syphilis.

The advances in pathological knowledge following the demonstration of the *Spirochæta pallida* in syphilitic lesions have, however, compelled a revision of the teaching. Carrera, 1919,[6] working on Warthin's material of a series of one hundred and fifty-two syphilitics at autopsy, found an incidence of fibrosis in the lungs comparable with that observed in other organs of the same cases. The lungs of twelve (8%) presented a specific syphilitic pathology of clinical importance, in the form of gumma, fibrosis, peri-bronchitis and arteritis. Besides the patients followed to autopsy and dealt with under the heading "Pathology of Pulmonary Syphilis," we have had opportunities of investigating thirteen others in whom syphilitic disease of the lungs was the clinical diagnosis; but this was not verified by *post mortem* examination. We have analysed the case histories of the patients of both series and we now proceed to present a synopsis of the symptoms and signs found and to discuss the diagnosis and treatment of pulmonary syphilis.

Ætiology.

Apart from the essential cause, the *Spirochæta pallida*, other ætiological factors may be considered.

Age.

Excluding one patient, aged sixteen years, a congenital syphilitic, the ages of the patients on coming under observation in this series varied from thirty-two to seventy-nine years, with an average of fifty-one years. The age at onset of symptoms averaged forty-four years.

Sex.

In this series the disease occurred three times as frequently in males as in females.

Occupation.

It is difficult to determine how much the nature of the occupation predisposes to symptoms; one-third of the patients in this series belonged to trades in which there is special likelihood of dust occurring—mining, stone-cutting, blacksmithing.

Symptoms.

Syphilitic disease of the lungs may be entirely latent, giving rise to no symptoms during life and appearing only at examination *post mortem*.

Onset.

Where symptoms appear, it is usually late in the course of syphilitic disease. In the few cases in which a definite time of infection with syphilis could be traced, the onset of symptoms took place late, from eight to fifteen or twenty years after; in one instance the infection was certainly congenital, in another probably so, symptoms appearing at the age of seven years and twenty years respectively.

Four patients dated their symptoms from an attack of pneumonia. The disease may set in with a sudden attack of hæmoptysis.

The onset, however, is usually gradual, cough being the first complaint. The cough increases and is later accompanied by profuse expectoration (bronchorrhœa). Expectoration of blood-stained sputum occurs and clots of blood may be brought up.

Often the patients describe periodical severe attacks of coughing which result in much sputum being brought up and which are followed by ease and comfort for some hours.

Gradually more or less breathlessness on exertion supervenes. In a few cases the patient becomes orthopnœic.

Pain in the chest from pleural involvement usually occurs late in the course of the disease.

Sweats are rare, but appear where there is a secondary infection of a bronchiectatic cavity.

In many patients the course of the disease is of a relapsing type, exacerbations of coughing and hæmoptysis (intercurrent bronchitis) alternating with lessening of symptoms and amelioration of the patient's general health. These relapses may be at considerable intervals. One patient described attacks of cough and hæmoptysis eight, five and two years before the present attack; between the attacks she was comparatively free from symptoms.

During the exacerbations there is loss of weight, which is recovered in the intervals. Wasting is not a conspicuous feature in the disease.

Physical Signs.

The usual clinical examination of the chest may yield no information, even though the patient is inconvenienced by symptoms and even when the X-ray examination is able to reveal considerable involvement. When clinical signs are present, more or less dulness is detected over the affected area. The vesicular murmur is absent and replaced by various types of breath sounds, depending on the condition of the lung and the amount of dilatation of the bronchi, so that tubular, bronchial or cavernous types of breathing may be audible. There are usually signs of bronchitis (dry or moist sounds), which may be localized to the dull area or may be diffused throughout the lungs.

X-Ray Examination.

Radioscopic investigation shows that the diaphragm on the affected side is drawn up and its mobility is restricted. The affected lung shows irregular patchy dulness in places and in other parts, particularly near the hilus, there may be large, dense shadows continuous with the mediastinum and projecting into the lung. The lung may be collapsed and the heart more or less drawn over. Where there is dilatation of bronchi, signs of cavitation may be seen.

The site of the disease is three times more frequently on the right side than on the left in the

series here reported and half of those on the right side were situated in the middle lobe or in close relation to the hilus of the right lung.

The sputum contained a variety of micro-organisms, but no tubercle bacilli. The patient's serum reacts positively to the Wassermann test.

Diagnosis.

Syphilitic disease of the lung gives rise to no characteristic train of symptoms; it is merely one of the components in the scrap-heap of "chronic interstitial pneumonia," "pulmonary fibrosis or cirrhosis of the lung."

On further analysis the cases in this series fall, however, into two groups; in one the symptoms and signs tend to resemble those of pulmonary tuberculosis, while in the other they point rather to those of intra-thoracic neoplasm. The symptoms and course of these two types of the disease may be correlated with a difference in the underlying pathological condition; in the former there is mainly peri-bronchial and peri-vascular fibrosis in the septa of the lung; in the latter a gummatous and fibrotic condition spreading from the hilus outwards.

The exclusion of tuberculosis probably is the greatest difficulty. Even repeated failure to find tubercle bacilli in the sputum does not exclude tuberculous infection; and the need for searching for the bacillus by modern methods (concentration of sputum and inoculation of guinea-pigs) is to be emphasized. A reaction to the Wassermann test is evidence of the activity of a syphilitic lesion in some part of the body; but is not diagnostic of invasion of the lung by the syphilitic process, even in the presence of lung signs. In four cases investigated and finally discarded from the present series, we found in the presence of a positive response to the Wassermann test and undoubted tuberculosis of the lungs, no evidence of syphilis in several parts of the lungs carefully examined histologically. In many instances it would be a debatable point as to whether the syphilitic lesion had lit up an old and latent tuberculous infection of the lung or whether tubercle bacilli became sown on a pulmonary syphilis. The difficulties are illustrated in the following case history from a patient under the care of Dr. Rowden White, to whom we are indebted for opportunities of investigating this man:

M., aged thirty-two years, labourer. Cough began during the winter of 1919 and later became paroxysmal; hæmoptysis occurred in December, 1919; dyspnœa on exertion began in April, 1920. The patient had further hæmoptysis in August, 1920; but at that time physical examination of the chest yielded no abnormal signs. X-ray examination then revealed mottling beneath the right clavicle; the right diaphragmatic movement was much impaired and dense posterior mediastinal peri-bronchial fibrosis was reported. His sputum was examined without success for tubercle bacilli on several occasions. His serum gave no reaction with the hydatid complement-fixation test, but reacted with the Wassermann test; and he admitted having suffered with a venereal sore at the age of nineteen years. He was treated for twelve months (August, 1920, to August, 1921) with mercury and iodides and in August, 1921, had six intravenous injections of "Novarsenobillon," followed by much improvement. In March, 1922, he had severe hæmoptysis; crepitations were heard at the apex of the left lung; tubercle bacilli were found in the sputum. After improvement in a sanatorium, he reported in January, 1923, and was found to have crepitations in the upper lobe of the left lung and upper part of the lower lobe of the right lung.

The inter-relation of syphilis and tuberculosis of the lungs is a subject of investigation at present in the Institute.

An apical tuberculosis may be simulated by pulmonary syphilis (Landis and Lewis) and we have already suggested that the lesion in such cases is a gummatous fibrosis of sub-pleural origin.

We have been struck with the number of cases in our series of pulmonary syphilis that have shown a relapsing course, symptoms being absent often for long intervals.

In the other type of pulmonary syphilis, confusion may arise with pulmonary neoplasm, hydatid, mediastinal tumour and aneurysm.

Clinically syphilis of the lungs may be suspected if there is a slow course and long duration of symptoms, recurring hæmoptysis, evidence of fibrosis of the lungs and bronchiectasis, especially in the lower parts of the lungs, absence of tubercle bacilli in the sputum, a positive Wassermann reaction and not much interference with the general health.

Treatment.

When syphilis of the lung has been diagnosed, should vigorous anti-syphilitic treatment be adopted? The answer is surely that it should be. The teachings of modern pathology lead us to believe that there is activity and progress of the lesion, even in these chronic cases of syphilis, and that anti-spirochætal remedies ought to be given and pushed. Harrison,[7] in a lecture on the modern treatment of syphilis, described happy results after intensive treatment with arseno-benzol injections and mercuric inunctions, even in such cases as general paralysis of the insane. Stawell[8] recommends in the treatment of chronic visceral syphilis a short course of intravenous arsenic compounds and continuous treatment with a mercury and iodide mixture (often with arsenic too) by the mouth, so that there may be always some anti-spironemal substance circulating in the tissue fluids of the body.

Five patients in this series were reported to have shown much improvement in their general health and amelioration of their symptoms after vigorous anti-syphilitic treatment.

Laurie[9] has recently reported the clinical history of a patient who probably was suffering from syphilis of the lung; the patient improved under anti-syphilitic treatment.

Summary.

1. In a series of patients with symptoms of intra-thoracic disease suspected to be hydatid it was found that the serum, while failing to react to the hydatid complement-fixation test, reacted to the Wassermann test. This led to an analysis of the ultimate diagnosis being made.

2. One of these proved to be a case of hydatid disease in a syphilitic patient, in which "hydatid antibody" in the blood was not detected.

3. Three were probably cases of aneurysm of the aorta.

4. Four were cases of tuberculosis of the lungs in syphilitic patients.

5. Further studies were then carried out on

patients in hospital and at *post mortem* examination.

6. A brief account of the pathology and symptomatology of pulmonary syphilis is given, based on an analysis of a series of eighteen patients coming to *post mortem* examination and of the clinical histories of fourteen other patients; all of these showed evidence of disease of the lung and their blood serum reacted to the Wassermann test.

7. Five patients who were subjected to intensive anti-syphilitic treatment, showed considerable improvement.

Acknowledgements.

We are grateful to the members of the medical and surgical staffs of the metropolitan hospitals for allowing us to follow up the progress of their patients.

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Reports of Cases.

AMŒBIC DYSENTERY IN WOMEN.

BY S. W. PATTERSON, M.D.,
Director of the Walter and Eliza Hall Research Institute, Melbourne.

DURING one week recently *Entamœba histolytica* was found in the fæces of two women who had not been outside Victoria.

Mrs. M., aged fifty-four years, under the care of Dr. W. R. Boyd, had an acute onset of diarrhœa, with the frequent passage of blood and slime, with tenesmus. In the muco-pus of which the stools consisted, were numerous *Entamœbæ histolyticæ* in the active amœboid stage, on culture a dysentery organism of the Flexner type was isolated. The response to treatment with emetine was immediate and the patient is reported to be convalescent. Close inquiry elicited that she had had off and on for the last twenty years slight attacks of diarrhœa, never lasting more than a few hours and never sufficient to cause her to take to her bed until this one. Her husband had had dysentery in the South African War twenty years ago, had been ill for about twelve months then and had been quite well since.

Miss G., aged fifty-four years, was admitted to the Melbourne Hospital under the care of Dr. S. V. Sewell. She had been quite well till May, 1922, when she had an acute onset of what she called dysentery, with pain in the abdomen, tenesmus and passage of blood and slime; she had blood and slime in her motions in variable amount ever since, with from five to ten evacuations in the twenty-four hours. She had been anæmic and weak since June. She had been under treatment for "bleeding piles." The stool examined showed muco-pus and blood and numerous *Entamœbæ histolyticæ* in the active stage. On inquiry for a possible source of infection, it was found that the nephew of the patient was a returned soldier and her niece's husband also; they were living in the same house. Neither had suffered from diarrhœa while on service or since their return. During the early part of 1922 the patient's brother had employed in the house a young man recently arrived from Liverpool and his mother "was bad with diarrhœa all the way out on the boat."

Comments.

Colville(1) observed a family in which the mother, two sons and a daughter were infected with amœbic dysentery from a returned soldier who had had dysentery in Egypt. None of the family had been outside Australia.

It is not infrequent to find that returned soldiers may have served for years in Egypt and France without apparent infection and amœbic dysentery may declare itself after their return. A patient admitted to the Melbourne Hospital under the care of Dr. H. H. Turnbull for amœbic dysentery and abscess of the liver on February 2, 1923, had had no intestinal disturbance sufficient to cause him to "report sick" during four years of service abroad. Amœbic dysentery first showed itself six months after his return and had recurred three times, when he had been under treatment for mucous colitis and gastric influenza.

One of the patients whose case is now reported, was probably infected from her husband, who had "dysentery" while serving in the South African War twenty years ago; in the other case the source of the infection was undiscovered.

Amœbic dysentery is endemic in England and was found in 1.5% of the ordinary population and up to 9.7% in asylum patients.(2)

Dew(3) collected from the literature references to eight cases of amœbic dysentery endemic in Australia, but no statistics of the occurrence of amœbic dysentery in Australia are available.

Dysentery is not even a notifiable disease in Victoria,[1] New South Wales and South Australia.(4)

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Reviews.

HEART DISEASE.

THE attitude of medical practitioners towards diseases of the heart has undergone some change in late years; a recent book by Drs. Cowan and Ritchie[2] on "Diseases of the Heart" is interesting on that account.

It is a well-illustrated work, written in a good style. The subject matter is interspersed with descriptions of illustrative cases and frequent references to the works of others are given in footnotes.

The two opening chapters are devoted to the anatomy and physiology of the heart; such matters as concern the

[1] Since this article was written, amœbic and bacillary dysentry have been made notifiable diseases in Victoria.

[2] "Diseases of the Heart," by John Cowan, D.Sc., M.D., F.R.F.P.S., and W. T. Ritchie, O.B.E., M.D., F.R.C.P.E., F.R.S.E., with a chapter on "The Ocular Manifestations of Arterial Disease" by Arthur J. Ballantyne, M.D., F.R.F.P.S.; Second Edition; 1922. London: Edward Arnold & Company; Demy 8vo., pp. xvi. + 605, with 321 figures in the text, including three coloured and two folding plates. Price: 30s. net.

heart in diseased conditions are dealt with more particularly. There is a good description of curves obtained from the polygraph and the electro-cardiograph. It is stated, however, that the normal electro-cardiographic deflections in derivation II., *P*, *R* and *T*, being upright, indicate that either the face or the right side of the heart is electro-negative and therefore in predominant activity, whereas the downward deflections *Q* and *S* signify negativity, namely, predominant activity of the apex or the left side of the heart. If the doctrine be adopted as put forward by Lewis of limited potential differences instead of that of distributed potential differences, this statement would raise a question.

A chapter is devoted to tonicity of the cardiac muscle. The subject is well presented. If the tonicity of the heart is good, its chambers do not become permanently dilated by physical exertion. If the tone is lessened by fatigue or disease, dilatation persists. Many people would not agree, however, with the statement that digitalis has a tonic action either directly on the heart muscle or indirectly by slowing its rate, thus prolonging the period of diastole. The authors state the fact that many physiologists do not accept tonicity as a property of cardiac muscle. If the term tonicity is used, surely it should be accurately defined.

In the case of auricular flutter, when the ventricles are responding to the auricular rate of 300 by a two to one rhythm, that is, beating at 150, the authors state that the cause is probably a prolongation of the refractory period of the ventricle, so that each alternate impulse from the auricle fails during the refractory period of the ventricle. There is definite experimental evidence that it is the refractory period of the auriculo-ventricular node which blocks the impulse. It has been demonstrated experimentally that the ventricles are capable of responding at a much higher rate and, when they do so respond to stimulation, the auricles beat at half the ventricular rate.

The subject of acute endocarditis is thoroughly handled and some good reproductions of specimens are shown. The authors should have devoted a separate description to subacute bacterial endocarditis, as it is a clinical entity, a definite disease which should be differentiated from other forms of endocarditis. It has a definite clinical history and is very insidious in its onset. The authors do not regard it as a specific disease; only a few lines in small print are devoted to the subject.

The authors quote Sir James Mackenzie to the effect that the integrity of the cardiac muscle is the most important factor in valvular disease. They do not mention that Sir James Mackenzie has also pointed out that the symptoms of heart failure with valvular disease cannot be attributed to the diseased valves. Heart failure is not the outcome of a valve lesion. A hundred pages are devoted to chronic valvular diseases from the points of view of their pathology, symptoms, diagnosis and prognosis.

Shortness of breath and other symptoms of cardiac failure are described on page 280 as symptoms of chronic valvular disease. This teaching will have the effect of directing attention to the valves as the cause of cardiac failure. There may be certain symptoms of cardiac failure more particularly associated with disease of the mitral valves than with disease of the aortic valves, but to state that these are symptoms of the valvular disease rather than symptoms of heart failure is not in accord with the doctrines of modern cardiology.

The subject of heart failure described under lesions of valves is very complete, but here again the mechanical factor in heart disease looms too large, whether this mechanical factor is considered as the strain so-called of chronic bronchitis or emphysema or the progressive destruction of valves. It would be preferable if the question of infection were placed in the forefront as causes of cardiac failure, for it is infection which causes disease of muscle tissue. This does not mean that valvular disease *per se* is of no significance.

The last chapters are devoted to diseases of the arteries and aneurysm and present the subject in a very readable and accurate form. In order to emphasize the importance of rest and posture the authors point out that recumbence alone may lessen the rate of the heart by 21,000 beats per day. Again, in recording the history of a patient, he is described as being a stone-breaker by occupation and an alcoholic by choice. These remarks are refreshing.

The book is a good one, notwithstanding the few defects to which reference is made. It is a book which practitioners will enjoy. We can recommend it.

THE HUMAN ELEMENT IN BUSINESS.

IN 1918 Dr. A. B. Fitt, a Lecturer in Education at the Auckland University College, delivered a series of lectures to a coterie of business men and women in Melbourne. He conceived the idea that in commercial life the human instincts were neither properly understood nor reasonably exploited. He did not find it necessary to cover the whole range of what he terms business psychology, for that would have led him into a discussion of many things that might have wearied his audience. His object was to assist those responsible for the control of large numbers of persons employed in business undertakings in applying scientific methods.

Dr. Fitt has now published a little book in which he recapitulates the main points discussed in his lectures.[1] The subject of psychology in lay minds is not always a real science. It is inconceivable to divorce the function of one organ from that of all the others and it is equally impossible to analyse the activities of a normal organ without having recourse to the comparative study of the activities of the same organ when altered by pathological processes or degenerative changes. The lay school of psychology ignores the fact that chemistry and physics lie at the basis of function and that pathology and physiology are but chapters in the science of bio-chemistry and bio-physics. The platitudes, the wild assumptions and the gratuitous interpretations of half-understood facts of this confused doctrine are strange foundations for a science.

Dr. Fitt is a keen observer and a good teacher. He dresses his lesson in a fascinating garb and calls it psychology. In reality he uses some exceedingly useful tricks and gives some admirable hints on the best methods of obtaining the best services of numbers of employees. What he things he is doing, namely, applying the doctrines of psychology to industry and what he succeeds in doing, namely, applying empirical methods which have been found to be sound, are two totally different things.

He is interesting in his ingenious discussion of the human instincts, the gregarious instinct, the instinct of imitation, the instinct of self-assertion and other instincts. But this is window-dressing; pretty display of irrelevant matter. Much of it is quite unproven and may be quite untrue. But beneath this gloss, he astutely inserts the fundamental principles on which the relations of human beings to one another must rest. If one man is to obtain the willing cooperation and helpful aid of many, he must lead them by suggestion, not by command or compulsion. If the employer demands loyal service and real interest in the affairs of the undertaking, he must evince a proper interest in the welfare and comfort of the employees and must accord them treatment that can be understood and appreciated. If the master expects a good output from his men, he, too, must be prepared to work at high pressure. These are things that have long been known and realized.

Dr. Fitt re-tells the old story, but he invests it with the halo of lay psychology. We dislike Dr. Fitt's American use of parts of sentences of Gothic type in the place of captions and do not admire his manner of presentation. For a pedagogue the habitual splitting of infinitives and other offences against the recognized laws of syntax are strange.

These defects notwithstanding, the book is worthy of study and will, no doubt, be of value to many who have the duty of managing men and women.

[1] "The Human Instincts in Business," by A. B. Fitt, M.A. (N.Z.), Ph.D. (Leipzig); 1922. Melbourne and Sydney: The Lothian Book Publishing Company, Limited; Crown 8vo., limp cover, pp. 99. Price: 3s. 6d. net.

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The Economic Value of Science.

THE DEPARTMENT OF HEALTH OF THE COMMONWEALTH now possesses a branch devoted to industrial hygiene. The initiation and organization of this branch are, to a large extent, the work of the International Health Board of the Rockefeller Foundation. The Commonwealth Government did not hesitate to take full advantage of the offer of aid, made in the name of humanity and provided out of riches gained industrially in every country, in every corner of the world. The Government displayed wisdom in accepting the proffered help and in appointing an Australian health officer as associate of Dr. A. J. Lanza, the International Health Board expert, to build up a new activity of departmental hygiene. Dr. D. G. Robertson has thus been placed in a position of advantage that will become more and more manifest when the American aid is withdrawn. A further advantage accrues in this connexion from the Constitution of the Commonwealth and from the peculiar circumstances of industrial endeavour. The officers of this branch have no power to impose compulsory conditions on employers. They work, as it were, on sufferance and avoid all action that might be regarded as interference with the sovereign rights of the several States. It will be seen that this branch of departmental activity is unusual, in that it relies on scientific knowledge interpreted by a specially trained individual, that it seeks to attain its ends by guidance and persuasion without any legislative backing and that it invites cooperation from professional and industrial sources, promising in return reasonable remuneration for work done to the medical practitioner, increased output and consequently increased profits to the employer and better health and greater prosperity to the employed. These promises are not irresponsible, political utterances, based on a slender argument, on a catch phrase, on an ephemeral presumption. They arise as a result of experience and have been fulfilled whenever they have been given. In an admirable article on a programme of national health in *The World's Health*, Dr. René Sand, the Secretary-General of the League of Red Cross Societies, pointed out that the activities of his programme are based on hygiene and not on human brotherhood, because science is unassailable and is accepted by all serious-minded people, while reform advocated for sentimental or political reasons leads to controversy and inevitable antagonism.

The objective of the industrial hygienist is to create a healthy environment for the worker, to eliminate avoidable dangers in industries, to regulate the hours and conditions of labour, to anticipate physical and mental failure and to prevent it by suitable correctives, to introduce comfort, contentment and harmony in the workshop and to safeguard the health of the individual. Dr. Sand expressed the opinion that the manufacturer can afford to remain indifferent to the evil influence that industry exercises over public health. He can replace his employees as fast as they are worn out. Industry, as a whole, cannot ignore the deterioration of its source of productive power. The first task of the industrial hygienist is to convince the manufacturer and large employer of the short-sightedness of the old policy and of the wisdom of all measures that contribute to the well-being, comfort and safety of the worker. If industry is composed of many reckless employers who are willing to replace one after another of their workers, a time must come when the level of efficiency in any particular group of workers is lowered and the output is diminished. It is obvious that any endeavour to achieve the objectives of the industrial hygienist must be associated with a general scheme for the improvement of the health of the community, if good results are to be attained. Dr. Sand puts one aspect in a neat sentence which should be repeated often and everywhere. "At about thirty men and women are fashioning the next generation and they

fashion it in the image of their own health." It does not matter much where the beginning is made, provided that no part is left untouched. The cleaning up of the workshop or factory may serve as the first practical item of the programme. By this is meant the removal of dirt, admirably defined as matter out of place, the introduction of storage systems, so that everything not in immediate use has its proper protected place, freed from accumulation of dust, the remedying of defects in floor covering, wall decoration, ceiling or roof construction, sanitary fittings and the like. All lumber and discarded and broken objects must be removed. The next step is the remedying of any faults in lighting, ventilation, heating and water supply. This may bring the industrial hygienist in temporary conflict with the employer, as his advice may involve the expenditure of considerable sums of money. Firmness and direct argument should suffice to re-establish good relations after the medical officer has persuaded the employers to carry out the alterations. The arrangements for meals and refreshment in safe and properly adapted surroundings should be suggested by the hygienist.

In regard to the special risks of each particular occupation, the industrial hygienist must lend aid to the department in collecting information of a reliable nature. Tentative measures may be introduced pending the result of collective investigations, but the permanent measures which would have the effect of removing trade hazards or reducing them to a minimum, must be planned on full and unquestioned evidence. The last division of the work has to do with the health of the individual. The medical officer has a watching brief. He should not wait until the employees come to him with complaints. He should enter the lives of every employee. If his observations lead him to the conclusion that a man should not be engaged in a particular trade or series of operations, it becomes his duty to effect his transfer to safe work. The medical officer should recognize that proper remuneration is a problem of hygiene, for poverty, as Dr. Sand points out, is the cause of physical and mental deterioration. Expertness in labour means constant employment, prosperity and contentment. Inadequate wages necessarily foster mediocre or bad workmanship, which in turn is indifferently remunerated. The efficient works medical officer is able to render signal services simultaneously to the employers and to the employee. Through his intermediation an industrial revolution may be effected, resulting in a wider distribution of health, wealth and happiness.

The medicine profession of Australia must equip itself quickly to come to the aid of the industrialist. There is much work to do and this work requires knowledge, patience, tact and the spirit of inquiry. The Department of Health is preparing the field.

THE MELBOURNE CONGRESS.

There appears to be abroad the spirit of delay. Members of the Branches of the British Medical Association in Australia seem to think that there is ample time between now and November next to make up their minds whether or not they will attend the first Session of the Australasian Medical Congress (British Medical Association), and whether or not they should offer to read papers before one or other section. The Executive Committee have been working hard and well and the programme is far advanced. The office-bearers of the sections have to produce preliminary programmes, so that nothing is left until the eleventh hour. A few weeks ago we published the preliminary programme of the Section of Surgery, together with an invitation to surgeons to contribute to the discussions. A few special subjects are being chosen as the main themes for discussion. Other subjects will be admitted, provided that the subject and the matter appear to be worthy of the occasion. The Honorary Secretaries of the eleven sections, after consultation with the Presidents and committees, are now arranging the special discussions and are inviting practitioners of eminence to open the debates and to bring their experience to bear on the deliberations. It is impossible for them to be aware of all the work that has been carried out in the different parts of the Commonwealth and they rely on the men engaged in this work to come forward with papers or contributions to the discussions. In some instances two or more sections are to hold sessions

in combination, while on November 17, 1923, a combined meeting of all the sections will be held for the purpose of a full-dress debate on tuberculosis. The success of a congress depends primarily on the care with which the selection of the readers of papers is carried out. Courage is required to refuse a paper or to arrange the discussions in such a manner that the faddist, the bore and the self-advertiser fail to secure a hearing. The Session in Melbourne promises to be an unqualified success, but this promise will not be fulfilled unless experienced and competent practitioners, with some new message to deliver, elect to take part in the deliberations. It must be remembered that the quality of the papers and of the debates will depend on the extent of the response to the invitation to the Executive Committee.

In endeavouring to ascertain the reason for the delay of many practitioners in joining and offering contributions, the organizers have two matters to consider. Human beings frequently require persuasion and persistent invitation before they will agree to do something that may be to their advantage. The attractions of this Session of Congress must be realized by the medical profession as a whole. Members are waiting to learn what their Melbourne colleagues have wherewith to tempt them. They need coaxing and reiterated invitation before they will signify their intention of leaving their practices and spending a week in the capital of Victoria. A few weeks ago a circular was addressed to every member of the Branches of the British Medical Association in Australia and New Zealand. This circular contained important information concerning the meeting and attached to it was a form of application for membership. The invitation should be regarded as urgent; an immediate reply should be sent. The Executive Committee will send messages to the medical profession from time to time in the columns of The Medical Journal of Australia, in order that interest may be awakened in the work. The second aspect involves the question of the value of a congress to those participating. Scientific workers have a right to demand the fullest publicity for their communications. In the past the "Proceedings of the Australasian Medical Congress" were distributed to the enrolled members and copies found their way into libraries. It must be recognized that this publicity was limited. Moreover, in some instances, the records were not complete. Medical practitioners ask for an assurance that their contributions will appear in the records of the proceedings and that these records shall be distributed as widely as possible throughout the whole world. The Executive Committee has not yet been able to arrive at a decision concerning the form of the records of the proceedings. A suggestion has been made that the Australasian Medical Publishing Company, Limited, should undertake the publication of the proceedings in a series of supplements to The Medical Journal of Australia, but this plan could only be carried into effect, if the extension of the printing arrangements of the Company were completed in time. The suggestion would have several advantages. In the first place, it would insure promptness in the publication. In the past a considerable interval has elapsed between the termination of the session and the appearance of the "Proceedings." In the second place, greater accuracy would be attained than if the technical matter were set up by the commercial printer. In the third place, the records would reach a far wider circle of readers than would a separate volume of "Proceedings" distributed to members of Congress and a few libraries. It is impossible at present to determine whether the printing arrangements will be available for this task by November. Until a definite answer to this question can be given, there must be some doubt concerning the exact form of the records of the proceedings of Congress. Members may, however, rest assured that the Executive Committee will take their duties in this connexion as seriously as they are taking their other duties.

It is therefore safe to assume that full publicity will be given to all communications offered to and accepted by the Executive Committee for presentation to Congress. We recommend all medical practitioners who have a message of importance to their profession, to deliver it at the Melbourne Session of the Australasian Medical Congress (British Medical Association) to be held from November 13 to November 17, 1923.

Current Comment.

THE CAPILLARIES IN ANAPHYLACTIC SHOCK.

For many years biologists and chemists have endeavoured to ascertain the true nature of the phenomena known by the term introduced by Charles Richet—anaphylaxis. In his original experiments Richet demonstrated that actino-congestin exerted a more powerful toxic action in dogs that had previously been subjected to an injection of this substance than in dogs not pre-treated in this manner. Rosenau and Anderson identified this phenomenon with that of the increased response of guinea-pigs to repeated injections of horse serum. A subcutaneous injection of several cubic centimetres of normal horse serum produces no baneful effect on a normal guinea-pig. If a small amount of horse serum be injected and a test dose be given ten days or more later, the animal manifests a sudden condition of shock, falls in convulsions and dies in the course of minutes. It was noted in the early experiments that rabbits do not respond in the same way as guinea-pigs. The shock in rabbits is recognized by a sudden fall in blood pressure, but convulsions and other signs of nerve storm are relatively uncommon. In dogs the fall in blood pressure is even more definite than in rabbits and the characteristic rigidity of the inflated lungs is regarded as peculiar to the condition. An enormous amount of experiment followed in the endeavour to ascertain the nature of this reaction. It was obvious to all workers that anaphylaxis must be a special instance of an antigen-antibody reaction, involved in all immunizing processes. Many hypotheses were presented, but the majority failed to explain all the facts connected with active and passive anaphylaxis and with anti-anaphylaxis. It has been generally accepted that the mechanism of active anaphylaxis is essentially the same as that of the passive process. If the serum of a sensitized animal, that is a guinea-pig, rabbit or dog that has received a subcutaneous injection of a protein in solution at least ten days previously, be mixed with a solution of the protein used in the sensitization and normal serum containing complement, the mixture acquires the property of eliciting the shock at once when injected in a normal animal. The immediate cause of the shock is obviously a newly-formed substance containing part or the whole of the protein molecule. Friedberger called this substance anaphylatoxin. He explained that a precipitate formed by the reaction of the protein with its corresponding antibody in the presence of complement and that his toxic substance separated from this precipitate. Doerr held that the antibody was identical with precipitin, but this view has been challenged. It may be asserted that the process of sensitization calls forth the production of an amboceptor which has a chemical affinity for the specific form of protein employed. It is possible that this amboceptor has the property of dissociating the protein molecule and of entering into combination with part of it. On the other hand, the cleavage process, as described by Victor Vaughan, does not appear to be a part of the phenomenon. The anaphylactic shock is dependent on the chemical combination of amboceptor and the protein molecule or part of this molecule and the toxicological action of this compound.

Much work has been planned for the purpose of determining the exact physiological nature of the shock. Clinically anaphylaxis is recognized by the fall in blood pressure, by the change in the lungs and by the disturbance in the central nervous system. It has been shown by intra-cerebral test injections that in guinea-pigs the toxic compound can act primarily on brain cells and kill acutely in the course of a few seconds. Professor W. H. Manwaring has found that the characteristic fall in blood pressure does not occur in dogs deprived of their livers. He has endeavoured to argue from this that the fall in our blood pressure in the shock is the result of the liberation of some substance from the hepatic cells which is endowed with an action on the extra-hepatic blood vessels. There is, however, much evidence to show that the antigen-antibody combination can act directly on other tissue and that the suppression of the fall in the blood pressure in the absence of liver cells must be due to the altered physiological condition of the circulation in the dehepatized dog. Professor Manwaring now comes forward with a new hypothesis. He, together with Messrs. R. C. Chilcote and V. M. Hosepian, has performed a series of experiments with the perfused lungs of dog.[1] The preparation of the specimen was carried out in the usual manner and well aerated Ringer's or Locke's solution was used as the perfusion fluid. The pressure of the fluid was kept at twenty-five to thirty millimetres of mercury. This fluid was used for about three minutes in the lungs of normal dogs and then from 0.25% to 1% of horse serum in Locke's solution was substituted. No recognizable reaction resulted. When the lungs of a sensitized dog were used, definite evidence of an increase in the permeability of the pulmonary capillaries became manifest. The rate of the flow is rapidly diminished and unless the concentration of the serum is very low, the organs become water-logged. The authors interpret the results of these perfusion experiments as evidence that the increased permeability of the pulmonary capillaries is the essential physiological change in protein sensitization, to which all other anaphylactic re-actions are secondary. No mention is made of any attempt to ascertain whether this alteration in the permeability of the capillaries can be induced in the lungs of normal dogs by a ready-made antigen-antibody mixture. It is not improbable that the toxic compound may act primarily on the arterioles and capillaries. The authors should produce the protocols of their experi-

[1] *The Journal of the American Medical Association*, February 3, 1923.

ments in full. From the scant details given there is little to show that the compound does not act on other tissues at the same time. Moreover, water-logging and slowing of the artificial circulation through the perfused organ is apt to take place unless great care is exercised in the manipulations. That the action is limited to the capillaries of the lungs would appear to be unlikely. The effect of an increased permeability of the pulmonary capillaries, if severe, must lead quickly to the death of the animal. In the guinea-pig the shock occurs so rapidly, especially when the toxic compound is introduced into the brain, that it is doubtful whether this change can be primary. For the present, therefore, it is unsafe to accept more than that this change in the capillaries occurs in the anaphylactic shock. It may be fundamental, but its importance may not be greater than that of the action of the toxic compound on nerve cells and on other tissues.

ARTHRITIS AND THE GLUCOSE TOLERANCE.

The study of altered metabolic conditions in the body in the presence of disease is one of the most helpful methods of gaining a true insight into the nature of the pathological process concerned. When a disease affects a certain organ or system, it is clearly seen that the part taken by that organ or system in metabolism may be seriously affected. Thus the glucose intolerance seen in diabetes is primarily due to a degenerative lesion of the cells of the islands of Langerhans. The lesion in question interferes with the internal secretion of the pancreas and, though the secretions of other glands, noticeably the thyreoid, are stimulated by hormones to increased activity, this increased action is not sufficient to deal effectively with the carbo-hydrate metabolism. It is conceivable and has been claimed by some observers that lesion and metabolic disturbance may be due to the same cause. What is more likely, as in an arthritic condition, is that the lesion, being either the site or the result of bacterial activity, elaborates some substance concerned in the dissociation of protein which stimulates hormonic glandular activity and in this way produces irregularity in glandular secretion. Hence the abnormal metabolic manifestations. There is, of course, a third possibility, namely that a lesion under investigation may be quite independent of a given alteration in metabolism. Where the two conditions are causally connected, one will often be found to vary with the other.

Pemberton and Foster in 1920 investigated the glucose tolerance of a series of patients in the American army suffering from arthritis. They found that there was a definite relation between the intake of food and the perpetuation of symptoms. They found that carbo-hydrates were most concerned in this connexion. Clinically they found that reduction in diet in suitable instances resulted in an amelioration of symptoms. They investigated the subject further by estimating the glucose tolerance of many of the patients, and found that in many instances it was diminished. Dr. G. L. Kerr Pringle and Dr. S. Miller have recently undertaken an investigation into the glucose tolerance of non-military patients in order to confirm the findings of Pemberton and Foster.[1] These observers point out that the patients examined by them, being located as they were in a hospital almost entirely given up to the treatment of patients suffering from arthritis, were necessarily affected by a more chronic form of arthritis than those examined by Pemberton and Foster. Of the one hundred patients whose condition was investigated by Drs. Pringle and Miller, fifty-six were suffering from an infective type of arthritis, three suffered from the metabolic type such as gout, eight had arthritis of traumatic origin, fourteen suffered from a degenerative type of arthritis as exemplified in senile osteo-arthritis, eleven had arthritis characterized by peri-articular fibrosis, and in eight the condition was accompanied by muscular fibrosis. The dose of glucose given to each patient was one hundred grammes of glucose in two hundred cubic centimetres of water. These observers apparently do not agree with Olmstead and Gay, who maintained that in such a test the dose of glucose should be estimated according to the weight of the patient. Olmstead and Gay maintained that this was the only correct method in view of the fact that the blood volume of an individaul varied approximately with that individual's weight. The glucose tolerance of a number of apparently normal persons was estimated. As a result of these observations it was determined that the maximum blood sugar percentage in a normal person during such a test fell below 0.17%. This figure was chosen as the limit of normality. It is unnecessary to enumerate in detail the figures and percentages observed in each group. It is sufficient to point out that in the presence of mild forms of arthritis of an infective nature, the average maximum blood sugar level fell below 0.17%. In severe infections of the same nature, the average maximum percentage was 0.19%. In only a few of the patients had any improvement taken place as a result of treatment. Patients in whom the disease had been arrested, had percentages well within normal limits. In the patients with peri-articular fibrosis the percentage was slightly above normal. Drs. Pringle and Miller accept this as evidence tending to confirm the view of the infective nature of such arthritic infections. The results obtained by these two observers are regarded by them as confirmatory of the work of Pemberton and Foster. They point out that the degree of intolerance is roughly proportional to the activity of the arthritic process. At the same time, they state that other factors, such as the action of focal toxins, may have a bearing on the glucose tolerance. The tolerance in these patients tended to return to normal as recovery occurred. It must be recognized as a result of this work that the application of this test may be of use in prognosis and possibly in the classification of arthritis.

[1] *The Lancet*, January 27, 1923.

Abstracts from Current Medical Literature.

SURGERY.

Abscess of the Lung.

Ambrose Lockwood (*Surgery, Gynecology and Obstetrics*, October, 1922), contributes an article on the subject of abscess of the lung. He deals with the subject historically, reviews the literature and discusses fifty-four instances in patients treated at the Mayo clinic. Many lung abscesses are the result of aspiration. The aspirated material may be a foreign body or it may be blood or mucus, as a result of surgical operations on the respiratory passages, particularly tonsilectomy. The inhalation of pathological products from suppurative lesions of these passages may be the determining factor. Of two hundred and eight instances of abscess following tonsilectomy, seven occurred in patients operated on under local anæsthetesia. From this the author concludes that such sequelæ may best be avoided by employing local anæsthetics whenever possible in surgery of the mouth, throat and nose, by keeping the patient's head low during general anæsthesia and by taking precautions to prevent the patient inhaling foreign matter. Only two of the collected instances were due to lobar pneumonia, and the author agrees with Whittemore, who says that pneumonia has seldom, if ever, been the cause of abscess of the lung, although the authors of medical text books state that it is the commonest cause. Whilst lung abscess more commonly follows broncho-pneumonia, only in the small percentage are they clinically recognizable. Influenza was the cause in ten cases of the series. A definite percentage is due to embolism in pyæmia.

An abscess that persists longer than two months is considered chronic. About four-fifths occur peripherally in the lung, a small percentage at the hilus and the rest centrally. On the right side 71% are found and about 62% in the lower lobes. Multiple abscesses occur in 25%, but are usually confined to the same portion of the lung. Abscesses due to pneumonia and influenza are usually peripheral, often multiple but confined to one lobe. Four-fifths are in the lower lobes, two-thirds in the right lower lobe. Three-fourths of aspiration abscesses are right-sided and about seven-tenths occur in the upper lobes. Those following aspiration of foreign bodies, teeth, tacks, etc., are more often in the lower lobe. The majority of those due to trauma occur in the right lower lobe. It is a disease of symptoms rather than of physical signs. The symptoms vary with the cause of the disease, the general resistance of the patient, the duration of the affection and the extent of pulmonary involvement. Clubbing of the fingers and watch crystal finger nails occur in a small percentage of instances, elastic fibres in the sputum in about one-third, albuminuria in about one-half. A peculiar recurrent course was present for many months in one-fourth and may have been due to partial closure for a time and bursting of the abscess into a bronchus. Of sixty-three instances reported by Norris and Landis, definite physical signs were present in eight only, in two-thirds the signs of cavity were lacking or not characteristic. Dulness on percussion and diminished breath sounds are amongst the most constant, whilst diminished movement of the chest wall and retraction of interspaces are important signs. The diagnosis depends on the history, the amount and nature of sputum and X-ray and physical examination. The prognosis is more favorable if the abscess is acute, single or apical or if it follows lobar pneumonia or trauma. In metastatic abscesses and those following broncho-pneumonia the prognosis is bad. It is more favorable in aspiration abscesses than those due to foreign bodies. Less than one-fourth require surgical operation. Foreign bodies should be removed. The author states that a thorough preliminary trial of medical treatment should be made, rest, feeding, large doses of sodium bicarbonate and glucose with postural drainage being used. Except for foreign bodies, use of the bronchoscope is avoided. The formation of a pneumo-thorax is especially indicated in severe hæmorrhage or small, well localized abscesses connected with a bronchus. Operation is indicated after medical treatment has failed, in patent cavities with markedly fibrosed or calcareous walls, for removal of foreign bodies in some cases and in very large abscesses. The exploring needle is highly unreliable and dangerous and is not used by the author. In patients acutely ill drainage through an area firmly adherent to the chest wall should be stabilised. In other instances, paravertebral anæsthesia and gas and oxygen anæsthesia are used and a more radical three-stage operation is performed.

Pneumonia is the usual cause of death after operation. Empyema is serious, especially if contralateral. The mortality for patients treated both medically and surgically is high, especially in children and adults past middle life.

Sports Injuries.

Frank Romer (*The Practitioner*, January, 1923), writing on sports injuries, advocates that the "do nothing but rest and be quiet" method of treatment is to be avoided.

Tennis or golf elbow is an inflammatory condition of the muscles around the elbow, caused also by fly-fishing, weeding and fencing. Sudden onset is rare, the condition gradually increases in severity. Three distinct types occur. The most common variety is a condition analgous to a teno-synovitis in the muscles around the elbow joint. Usually the external condyle and the *supinator longus* and *extensor communis digitorum* muscles are affected. This is probably due to the use of large handle rackets. Approach shots at golf and playing with a cut at tennis tend to affect the muscles of the internal condyle. The faulty muscles become cramped, indurated and painful on pressure, and pain occurs only with certain movements. In the second type a tender spot is found on the condyle itself and is sugestive of a localized periostitis. The third type occurs alone or in conjunction with the preceding two. It is a simple arthritis of the radio-ulnar joint, which may eventually undergo bony change. The most successful treatment is massage for about ten days confined to the affected muscles. After this the arm should be strapped and the games may be continued. In the two latter types, radiant heat or ionization may be required and rest must be more prolonged.

Rider's strain is usually due to a sudden swerve of the horse while jumping or galloping or any action that may cause overstrain of the adductor muscles. The pelvic attachment of the adductor longus or the body of the muscle is usually affected. Sickening pain is experienced and the rider cannot grip the saddle. A painful swelling appears on the inner side of the thigh, sometimes there is a small groove in the muscle. There is often severe ecchymosis. Daily massage for about a week is usually required and during this time walking is allowed. Later when swelling has subsided the part should be strapped and quiet riding may be permitted. The strapping is continued until all pain during and after riding has disappeared. In recurring rider's strain atrophy of the thigh muscles and contraction of the adductors is generally present and may require forcible stretching under an anæsthetic. If the adductors are extremely rigid an X-ray examination should be made to ascertain the presence or not of so-called rider's bone.

In running, especially at the start of a race, partial rupture of the hamstrings may occur.

Lawn tennis calf is an injury characterised by its suddenness, and is due to the rupture of some fibres in the muscular structure of the calf. The situation varies. Swelling and ecchymosis rapidly follows. Careful strapping from ankle to knee and immediate use of the limb is essential. Complete recovery occurs in three weeks. Sometimes the *tendo Achillis* is partly ruptured by a similar action. The above treatment is often all that is required, though suture may be necessary.

Sprain of the long head of the biceps muscle of the arm is often caused by bowling or throwing at cricket. This causes a teno-synovitis. The only treatment required consists in radiant heat and massage, but if the

condition is neglected, the shoulder-joint frequently becomes involved and adhesions are caused. Slow voluntary movements should be tried from the first. In some instances, acute synovitis is present. When first used again the arm should be supported by straps. Inflammation of the sub-deltoid bursa is common in athletes. It is often due to falls and, if ignored, may become chronic.

"Dropped top" or "baseball" finger is common in cricket. It is caused by a sudden blow on the tip of the finger, causing a splitting or tearing of the attachment of the *extensor communis* tendon to the terminal phalanx. Massage of the injured joint is advised, but complete recovery of voluntary extension is doubtful without operation. A sprain or tear of some fibres of the oblique muscles of the abdomen is also common in cricket. The treatment is massage until pain in ordinary movement has subsided. Strapping should then be applied to the body while it is flexed towards the affected side.

Football and all games are likely to cause injury to the knee joint. For simple sprain rest on a pillow, light massage, ice bag or foments until effusion subsides are required, then the patient is allowed to walk. If there is any muscular wasting of the thigh muscles, it is most important that it should be remedied before the patient is allowed to resume athletic life. Schlatter's disease occurs in youths under seventeen years. If rest and abstension from games is useless, open operation should be performed and the tubercle of the tibia driven into place by a few sharp blows.

Acute teno-synovitis of the *tendo Achillis* is due to tying the lace of the boot too tightly round the ankle, causing swelling of the tendon sheath and great pain. Abstension from wearing a boot, massage and radiant heat generally cure the condition.

Sprained ankle is common to all sports and undoubtedly the most successful treatment is repeated strapping and immediate use.

Cholecystectomy.

OTIS F. LAMSON (*Annals of Surgery*. January, 1923) discusses certain aspects of the surgery of the gall-bladder. He advocates the performance of cholecystectomy in preference to cholecystostomy. Extreme conservatism was formerly the rule. If stones were found in a gall-bladder they were removed and the organ drained. It was only the hopelessly diseased gall-bladder that was sacrificed. The recurrence of symptoms, following drainage of the gall-bladder, gradually produced an increasing number of cholecystectomies and the excellent results of this operation still further augmented the number of removals. The gall-bladder, once its mucosa or wall is infected, has but little power of destroying the infection. The free lymphatic path between the gall-bladder and the head of the pancreas leads to secondary inflammation of the pancreas. Whatever the true function of the gall-bladder may be, it is not a reservoir for bile, as its capacity is only thirty cubic centimetre and this amount is but little more than 2% of the bile secreted daily. It is but a poor force pump for the bile, as its power of contraction can raise the pressure in the duct very little above the secretion pressure of the bile. It adds mucus to the bile and probably causes the bile flow into the intestine to be more or less intermittent. The author quotes the assertion of Sweet that the gall-bladder empties itself by the pressure of the liver and the distended stomach during digestion, and by the milking action of the peristaltic waves that pass down the duodenum. He reports a case of a young girl who had had typhoid fever four years previous to coming under his care. She was then a typhoid carrier, the bacilli being found abundantly in her stools. Though she was free from gall-bladder symptoms, he suspected that the nidus of infection might be in the gall-bladder and removed it. Several stones were present, and a culture of typhoid bacilli was obtained from its contents. The girl after the operation was no longer a carrier, her stools being free from *Bacillus typhosus*. The author removes the gall-bladder in all instances, except when the general condition of the patient is so serious as to contraindicate the more severe operation, when there is any danger of stricture of the common duct and in patients suffering from long-standing jaundice in whom there is a tendency to hæmorrhage. In performing the operation he severs the cystic duct first and works up towards the fundus. After severe operations on the gall-bladder and ducts dense adhesions may form with resulting obstruction to the duodenum and pylorus. Gastro-enterostomy may then be required.

Arterial Decortication.

C. LATIMER CALLANDER (*Annals of Surgery*, January, 1923), discusses arterial decortication. His interest in the subject was aroused by reading articles by René Leriche and also by an instance reported by Professor Halstead. This was in a patient who suffered from aneurysm of the left subclavian artery. The aneurysm with a complete section of the vessel was excised. The affected arm and hand, which before the operation had been cold, became conspicuously warm afterwards and remained so for several weeks. Leriche ascribes such a result to the interruption of the sympathetic fibres around the subclavian artery. The author states that Leriche's view demands that the fibres to the peripheral branches of an artery join the main artery near its origin. Many authorities do not admit this, but state that sympathetic fibres are being supplied continually to arteries during their course. The operation of arterial sympathectomy is performed by exposing the selected artery by the classical route. The external fibrous sheath is incised for a distance of eight to ten centimetres. The inner or intimate sheath is now exposed. It is grasped with tissue forceps and incised directly on to the vessel wall. The loose filmy areolar tisue is removed until the artery is bared all round. Leriche states that certain reactions follow this operation. During the operation the vessel wall may contract probably from local stimulation. Later vaso-dilatation and rise of surface temperature follow in the area of the limb distal to the site of operation. With this there is an accompanying rise of peripheral blood pressure. Leriche practised his operation in the treatment of certain traumatic disorders of the Babinski-Froment type. In this type after a minor injury various contractions and pareses appear almost immediately. In addition vaso-motor, secretory and trophic disturbances are noted, due, according to Leriche, to a reflex stimulation of sympathetic fibres. Other conditions which Leriche treats by sympathectomy, are the causalgia of Weir Mitchell and spontaneous ulcers in amputation stumps. Leriche considers that the mechanism of the production of these conditions is involvment of the sympathetic fibres and, as has been stated, believes that the sympathetic fibres going to peripheral vessels join the main artery near its origin and course along its outer coat to its finer branches. This view, which is essential to the success of the operation of sympathectomy, is not held by anatomists and physiologists. They are of opinion that the vaso-motor and sympathetic fibres in general are carried to the periphery in the spinal nerves, and are distributed to distal structures by communications from the peripheral branches of these nerves. Callander records the results of ten cases of arterial decortication. In one group in which the pains in the extremities were considered to be due to arterial spasm, no improvement followed, in fact, the condition in one patient progressed so far as to require amputation for gangrene. In the second group, in which no arterial pulsation could be detected, one cure resulted in a patient who had had gangrene on the middle toe of the left foot. The ulcer healed and remained so. A second cure followed sympathectomy in a patient who had an unaccountable pain in the thumb.

Acute Obstruction of the Colon.

J. P. LOCKHART-MUMMERY (*The Lancet*, November 25, 1922) states that when the surgeon can be reasonably sure that obstruction is due to a growth, it is more advisable to perform caecostomy than to explore the abdomen. Such a procedure renders subsequent resection safer. The author does not agree that caecostomy openings are hard to close. This is not so if a large rubber tube (diameter 1.75 centimetres) is invaginated into the opening in the caecal wall.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, on February 14, 1923, DR. L. S. LATHAM, the President, in the chair.

Protein Therapy in Rheumatoid Arthritis.

DR. HENRY LAURIE read a paper on "The Intravenous Therapy of Rheumatoid Arthritis" (see page 309).

DR. G. E. FOREMAN read a paper on the "Behaviour of the White Blood Corpuscles after Intravenous Bacillus Coli Communis Therapy" (see page 314).

DR. A. V. M. ANDERSON, in opening the discussion, said that the members of the Branch were greatly indebted to Dr. Laurie for the interesting manner in which he had brought before them recent advances in the treatment of that hitherto very resistant disease, rheumatoid arthritis. The results attendant upon intravenous bacterial protein therapy, as it had been employed by Dr. Laurie, appeared to be very satisfactory. His own experience of this method of treatment was not great but some of his colleagues on the staff of the Alfred Hospital were very enthusiastic regarding its efficacy in relieving pain and arresting the course of the disease.

He was reminded of the publication in the *Mayo Annual* several years ago of an article which was written to show that a large portion of patients affected with rheumatoid arthritis benefited greatly by the operation of enucleation of the tonsils and in the particular series reviewed it was claimed that in 70% to 80% the disease was much ameliorated. He himself was convinced of the necessity for the removal of septic foci and had no doubt that the removal of septic processes was much more effective in the treatment of rheumatoid arthritis than the administration of autogenous vaccines without removal of septic foci.

There could be no doubt that attention to focal infections was of the highest importance and was often followed by a considerable measure of success in alleviating this frequently intractable disease.

Dr. Anderson mentioned as a point of interest that the intervention of acute disease sometimes led to remarkable improvement in rheumatoid arthritis. He recollected a child whom he had once shown at a clinical meeting as a typical example of Still's disease, and in whom great improvement in the polyanthritis followed an attack of measles.

Was there any correlation between such effect of acute diseases and those of the febrile reactions which ensued on the intravenous injection of *Bacillus coli communis*? He had been interested to note that in some instances Dr. Laurie had given the intravenous injection on two or more successive days, and also that acute and sub-acute types of rheumatoid arthritis, while they were uninfluenced by salicylate of soda, responded to the intravenous vaccine injections.

In conclusion, Dr. Anderson again expressed his thanks to Dr. Laurie for the interesting paper with which he had introduced the subject for discussion.

DR. J. NEWMAN MORRIS congratulated Dr. Laurie on his paper and on the results he had obtained in the treatment of a disease which was at all times troublesome, alike for the patient and for the physician. He had experienced some good results hitherto by the use of repeated intramuscular injections of "Fibrolysin," combined with the breaking down of adhesions where they existed.

Having regard to the warnings given of the reactions to be anticipated, he had treated a few patients affected with rheumatoid arthritis by intravenous vaccine injections and in some instances he had experienced reactions of alarming severity. It was evident that this mode of treatment was not appropriate to out-patient practice and that the patient must be detained in hospital for at least twenty-four hours after the injection. The reactions, as Dr. Laurie had described, consisted of rigor followed by rise in temperature of varying degree. Although he had observed some improvement in the disease, the ultimate results of the treatment had not been very gratifying, nor had he observed any immediate ameliorating effects, such as had been described by Dr. Laurie.

A disadvantage in the treatment of rheumatoid arthritis by intravenous injection of vaccine was that as a result of the reactions induced it was sometimes difficult to persuade the patients to continue. It was of interest to recall that similar reactions had occurred after the introduction into the circulation by the intravenous route of "Eusol," salvarsan and even saline solution.

He had been very interested to note the dosage of vaccine employed by Dr. Laurie, from whose paper it appeared that a dose comprising 25 to 30 millions of bacilli was an adequate amount. He (Dr. Morris) had adopted a recommendation of 100 millions as an initial dose; this was increased rapidly to 250 millions, but in view of Dr. Laurie's results it appeared that these doses were unnecessarily high. He wished to ask Dr. Laurie if he considered it likely that the fact that he had used typhoid-paratyphoid vaccine instead of *Bacillus coli communis* had affected the results of treatment.

In conclusion, Dr. Morris expressed his thanks to Dr. Laurie and remarked that the members of the Branch would very much appreciate the valuable collection of data which he had placed before them.

DR. SYDNEY PERN tendered his congratulations to Dr. Laurie on the excellent results he had achieved in the treatment of a disease which a few years ago medical practitioners could not but wish to avoid. The whole outlook in rheumatoid arthritis was now completely changed in a manner all to the advantage of the patients. Undoubtedly the method of treatment so admirably presented by Dr. Laurie, with the quick benefits it conferred, had come to stay and was a great advance on former practice in the treatment of rheumatoid arthritis.

Dr. Laurie had mentioned that in certain instances he had been unable to find an infective focus, but he (Dr. Pern) was convinced that in rheumatoid arthritis such focal infection must be present. It might require very diligent search for its discovery, but it was imperative that the practitioner should seek it patiently and systematically. In a number of instances in which the eradication of septi foci had not been followed by any benefit and there were no more to be discovered, he had sent the blood for a complement fixation (Wassermann) test. The pathologist had reported that he had obtained a reaction. In such cases anti-syphilitic treatment had been effective in arresting the disease and he now made it a routine to have the Wassermann test carried out with the serum of patients with rheumatoid arthritis. It was also to be borne in mind that in a small proportion of individuals with polyarthritis the pathological process was tuberculous.

Reverting to the question of septic foci Dr. Pern said that the responsible infective focus was often very much concealed. He recollected a woman affected with rheumatoid arthritis in whom an obvious source of infection was presented by *pyorrhœa alveolaris*. This was cleared away by appropriate measures, with, however, but little effect on the arthritic disorder; it was only by careful inquiry into the history of her former ill-health that he had been enabled to localize the infective focus in the gall-bladder.

The question of infected tonsils was one which had been very much discussed, and he frequently heard it said that it was difficult to determine when tonsils were infected. He would go so far as to say that all tonsils were septic because if not, they atrophied at an early age. If growth of the tonsils persisted during adult life they could be

sure that the crypts were harbouring organisms which sooner or later would exert their baneful effects. The ability or otherwise to express pus from the tonsils was no guide as to whether they were septic or not, and a person might carry infected tonsils until he or she was 50 years of age, when rheumatoid arthritis or other manifestation of septic infection would supervene. In conclusion, Dr. Pern said that he had been greatly impressed by the rapidity with which improvement followed the intravenous vaccine treatment.

DR. R. HOWDEN asked if the intravenous injections of *Bacillus coli communis* vaccine had been found to have any effect on the bacilluria which Dr. Laurie had mentioned as being present in a number of the patients with rheumatoid arthritis.

DR. F. L. DAVIES said that the thanks of all were due to Dr. Laurie for his investigation of what seemed to offer a most encouraging method of treatment in rheumatoid arthritis. In the past measures employed for the relief and cure of rheumatoid arthritis had been very disappointing and, in every instance in which he could recollect improvement, it had been very slow. He recollected a patient for whom a great variety of methods of treatment had been employed, including complete enucleation of the tonsils. This patient had subsequently made slow progress on the prolonged administration of tincture of iodine. Another patient also benefited by the exhibition of iodine and eventually reached a stage at which he was taking 40 drops of the tincture each day. Dr. Laurie's paper was most instructive and helpful and full of promise of the saving of an immense amount of time and trouble.

DR. L. S. LATHAM conveyed the thanks of the meeting to Dr. Laurie and to Dr. Foreman. While he had had no personal experience of the method of treatment under discussion, he had no doubt that all would feel that the record of clinical improvement put before them by Dr. Laurie was so arresting that the treatment of rheumatoid arthritis by intravenous vaccine injections merited an extended application. He hoped that Dr. Foreman would continue the interesting observations he had begun on the cytological changes in the blood associated with the intravenous injections. A very great advance would be achieved if by this method of treatment rapid relief could be afforded to a class of patients who had in the past occupied the position of derelicts of hospital practice.

DR. LAURIE, in reply, said that he very much appreciated the manner in which his paper had been received and that he had anticipated more adverse criticism. He had been afraid of speaking at too great length, hence his paper had been abbreviated to a rather bald statement of experience.

Dr. Anderson had commented on the fact that he had sometimes given the injections on successive days, but in this particular he was guided by the persistence of pain. If pain were still present on the morning following the injection, he gave a second and usually slightly increased dose.

Dr. Morris had been deterred to some extent by the severity of the reaction, but their experience at the Alfred Hospital had been that on the return of pain the patients asked for a further injection. One young girl attended the hospital every seven days for a period of thirty-three weeks.

He had found that the reaction induced was not always proportional to the dose. Although in the literature upon the subject an initial injection of one hundred millions was recommended, there was no necessity to use such a large dose. An injection of twenty-five millions was generally sufficient and in acute forms of the disease he reduced the initial dose to ten million organisms.

The typhoid bacillus had a less powerful action than *Bacillus coli communis* for the purpose under discussion and generally speaking larger doses, such as four hundred millions, were necessary to produce the ameliorating effects.

He quite agreed with Dr. Morris that the treatment was not such as could be carried out with safety in outpatient practice.

While not questioning the necessity for the removal of septic foci, he would suggest the value of intravenous injections of vaccine as a preliminary measure to cut short the attack. Even after the tonsillectomy or other measures directed towards the removal of focal sepsis, some time elapsed before benefit became apparent.

In reply to Dr. Howden, Dr. Laurie said that a number of the patients had suffered an attack of pyelitis and exhibited bacilluria at the institution of treatment for polyarthritis. While he had always administered "Hexamine," he thought the intravenous injections of *Bacillus coli communis* vaccine were of assistance in the elimination of the bacilluria. In conclusion, Dr. Laurie said that he wished to emphasize that if an acute attack of rheumatoid arthritis were taken in time, it could be completely cleared away and the risk of subsequent deformity abolished.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch meetings. The Scientific Committee reserves to itself the right to modify the arrangements, but it is hoped that no changes will be necessary.

April 11, 1923.

CLINICAL MEETING at the Children's Hospital, Carlton, at 8.15 p.m..

May 2, 1923.

At the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, at 8.15 p.m..

DR. KEITH FAIRLEY: "Leucocytes in Health and Disease."

MISSING JOURNALS.

THE following journals, which have been received by THE MEDICAL JOURNAL OF AUSTRALIA as exchanges, are missing. Each copy bears the stamp impression of this journal. It is requested that the present possessors of these missing journals return them to this office.

The American Journal of Anatomy: May, 1920.

Bulletin of the Johns Hopkins Hospital: March, April, September, 1916; February, April, May, July, 1918; June, July, September, 1920.

The Journal of Orthopædic Surgery: February, 1921.

New York Medical Journal: February 28, May 29, December 11, 1920; Index, January to June, 1921.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

ALPERS, PHILIP JACOB, M.B., B.S., 1922 (Univ. Melbourne), 110, Powlett Street, East Melbourne.

WILLIAMS, JOHN PRYCE, M.R.C.S., England, L.R.C.P., London, 1910, D.P.H., R.C.P.S., England, 1919, 95a, Mathoura Road, Toorak.

THE undermentioned have been elected members of the South Australian Branch of the British Medical Association:

TERRILL, FREDERICK EDWARD, M.B., B.S., 1922 (Univ. Adelaide), Adelaide Hospital, Adelaide.

WELLS, CLARENCE GORDON, M.B., B.S., 1921 (Univ. Adelaide), Auburn.

Medical Matters in Parliament.

THE HOSPITALS AND CHARITIES BILL.

(*Continued from page* 306.)

IN dealing with the postponed Clause 4, MR. FARTHING referred to the fact that under this clause a "contributor" to an institution means *inter alia*:

> (*c*) A person who, at any time within the twelve months next preceding the date of any meeting or election or any other date in respect of which the question of his being a contributor arises, has on his own behalf contributed to the institution at least £1 in one donation.

He moved:

> That after "donation" there be inserted "or produces evidence to the committee that he has on his own behalf contributed to the institution at least £1 in donations of a less amount."

MR. WEBBER moved a further amendment:

> That the amendment be amended by omitting the words "One pound," with a view to inserting the words "Ten shillings."

MR. MCPHERSON opposed Mr. Webber's amendment. He reported that hospital authorities had informed him that the setting of the standard at a lower figure than £1 would result in smaller donations being given by people who previously had given the sum of £1 and who had thereby secured a vote. He hoped that Mr. Farthing's amendment would be carried.

MR. WEBBER'S amendment was lost.

MR. J. W. BILLSON moved in regard to Mr. Farthing's amendment:

> That at the end of the proposed amendment there be added the following words: "or where any sum not less than £1 is paid into the funds of a hospital, the person forwarding same may nominate a contributor under this Act for each £1 contributed."

After much discussion this amendment was lost.

MR. FARTHING'S amendment was adopted.

MR. WEBBER referred to paragraph (*d*) of the same clause which provided: (definition of contributor)

> A person nominated as a contributor by any corporation, company or firm which at any time within the twelve months aforesaid has contributed to the institution at least £1 in one donation out of the moneys of the corporation company or firm.

He moved:

> That "or the employees of a corporation, company or firm" be inserted after "firm."

MR. MCPHERSON said that he was willing to accept this amendment, but as it did not give effect to Mr. Webber's intention, he undertook to see the Parliamentary Draftsman to have the clause redrafted in order to give effect to Mr. Webber's wishes.

The amendment was withdrawn.

The clause as amended with consequential amendments was adopted. Clauses 5 to 8 were approved. These clauses dealt with the following subjects: The exemption of certain institutions from the Act; the power of the Governor-in-Council to declare certain institutions to be separate institutions and the power to exempt certain institutions from the provisions of the Act; the power to determine whether an association is a benevolent society or an institution; the Talbot Colony for Epileptics to be an incorporated institution.

DR. ARGYLE proposed the following new clauses to come after Clause 40:

> Before any inclusive charge or fixed scale of charges of payments for patients is prescribed or approved under this Act, the Minister or the Board (as the case may be) shall take into consideration any representations made with respect thereto to the Minister or the Board by or on behalf of any recognized society of legally qualified medical practitioners in Victoria.

Dr. Argyle explained that the idea was that the scale of charges would be drawn up by the Governor-in-Council after consultation with the medical profession. The members of the staffs of the metropolitan and country hospitals were quite prepared to help in connexion with intermediate hospitals, but they thought that fees should not be fixed by the Governor-in-Council until they had been consulted in the matter.

MR. J. W. BILLSON expressed his approval of the proposal by Dr. Argyle, but as the nurses and attendants were vitally interested in the conditions under which they had to work, he moved:

> That the following words be added to the proposed new clause: "Also by the Unions of Nurses and Hospital Attendants."

MR. MCPHERSON said that there was no analogy between the position of nurses and hospital attendants and that of the doctors. Over 90% of the medical men belonged the British Medical Association and it would not be possible to get along without them. It would, however, be possible to do without an arrangement with the nurses and attendants belonging to any particular union. Nurses and attendants could be obtained outside the unions. Moreover, the wages of the attendants were already protected under an Act of Parliament.

After some discussion, in the course of which several members expressed approval of Mr. Billson's amendment, Mr. Billson withdrew his amendment in order to make a verbal alteration. He then moved:

> That the following words be added to the new clause: "and by or on behalf of any recognised organization of nurses and hospital attendants."

The amendment was carried and the new clause as amended was adopted.

DR. ARGYLE proposed a new clause to follow Clause 39:

> The Board may from time to time appoint and remove local committees to act as advisory committees to the Board under this Act, and such advisory committees shall have such powers and duties as are prescribed.

In reply to Mr. J. W. Billson, DR. ARGYLE said that this clause had reference to special committees.

The new clause was adopted.

MR. OLD proposed a new clause dealing with the method of election of a chairman for the board. After some discussion Mr. Webber moved an amendment to the effect that the Chairman would only have a deliberative vote.

The amendment was accepted and the amended clause adopted.

The schedules were passed unaltered.

The Bill was reported with amendments.

On October 31, 1922, the amendments made in the Bill in committee were considered and adopted.

On the motion of MR. MCPHERSON, the Bill was read a third time.

Mr. McPherson referred to the fact that he had promised to have a provision drafted to meet the wishes of members in regard to the definition of a contributor in Clause 4.

He therefore moved:

That at the end of paragraph (*e*) "or" be omitted and the following words be inserted: " (*f*) a person nominated as a contributor by the employees of any corporation, company, firm, or employer who at any time have contributed at least £20 to the institution in one donation or who have at any time within the twelve months aforesaid contributed to the institution at least £1, whether in one sum or in donations of a less amount; or"

The amendment was approved.

In regard to Clause 18 dealing with the standing committees for metropolitan and other institutions, MR. WEBBER proposed an amendment to the effect that the Chairman of such committee should have a deliberative vote only.

The amendment was approved.

In connexion with Clause 28 an amendment was agreed to on the motion of MR. MCPHERSON to the effect that a recommendation by the Board for the amalgamation or closing of institutions should be carried by an absolute majority of the whole Board.

It was further determined in regard to Clause 29 that the Minister should not recommend to the Governor-in-Council the closing or amalgamation of institutions unless he had given at least twenty-eight days' notice to every institution concerned and had communicated to them the nature of the recommendation.

On the motion of MR. MCPHERSON (Clause 34) it was further agreed that no refusal of registration should be made by the Board unless the resolution with regard to the same were carried by an absolute majority of the Board.

A similar amendment was carried in regard to Clause 38 (the cancellation of registration) as had been carried in regard to Clauses 29 and 34.

MR. MCPHERSON pointed out that he wished to modify the provisions of Clause 41 dealing with the powers given to the Inspector of Charities so that the clause would be in accord with the wishes of members. He therefore proposed an amendment to the effect that inquiries by the Inspector of Charities should be made at the direction of the Board.

At Mr. McPherson's suggestion an alteration was made in Clause 46. The following amendment was agreed to:

(3) No person or body of persons shall, without the approval of the Board, appeal for subscriptions or contributions to any institution or benevolent society outside the particular district or area which such institution or benevolent society serves; and if any question arises as to the district or area which such institution or benevolent society serves, the Board shall decide the same, and its decision shall be final.

MR. MCPHERSON proposed in regard to Clause 52, dealing with the incorporation of charitable institutions, an amendment to the effect that the provisions of the clause covered institutions affording charitable relief to convalescent persons. The amendment was agreed to.

MR. SNOWBALL moved that Sub-clause 6 in Clause 54 be omitted. This sub-clause dealt with the provisions for the election of women as members of the committees of institutions. He did not think that individual committees should be interfered with in regard to the management of their institutions. If this sub-clause were allowed to stand it would be the cause of resignations.

The amendment was agreed to after some discussion.

Correspondence.

THE DIAGNOSIS OF DENGUE FEVER.

SIR: The short paper by Dr. Paget Thurston calls for criticism. While admitting that "dengue" is a rather vague term and possibly covers several more or less distinct diseases, one feels it only right in the interests of accuracy to point out that the dengue of the north coast of New South Wales in 1915-1916 had certain definite characteristics of diagnostic value, some of which are not referred to by Dr. Thurston; others have been described by him very differently from the observations of Cleland and myself.[1] The numbers refer to the paragraphs in Dr. Thurston's paper.

1. The incubation period of dengue has been fairly accurately measured by our laboratory experiments and ranges between four and a half and nine days, but longer incubation periods occur up to even fifteen days.

3. Dr. Thurston says that in dengue there is "usually some rash on the skin—most frequently on the hands and feet." Our experience both in experimental and natural cases showed that rash was not always noticed, though perhaps generally present, but when it occurred was a very typical and quite distinct rash which we described fully in our various papers. Localization on hands and feet to me is not at all characteristic.

7. Dr. Thurston states "there is always a remission of pyrexia for a day or so." This did not seem to be always the case in the cases in 1916, either natural or experimental. In fact, continuous, intermittent or remittent charts are common. The "saddle back" type of pyrexia curve is perhaps the most common, the intermittent the least.

10. "Aspirin" was the stock remedy in the 1916 epidemic and was usually reported as useful.

Again, Dr. Thurston fails to note probably the most outstanding feature in relation to the diagnosis of dengue, slow pulse. Actual or relative, bradycardia was almost the rule in all our experimental cases and has been noted by other observers in natural ones. It is quite common to find a patient with a temperature of 103° F. with a pulse between 60 and 80 and absolute bradycardia of 40-50 has been frequently noted by us.

Other points in diagnosis which to me seem valuable:

(*i*) Absence of all catarrhal signs and symptoms (certain types of influenza also show no catarrh); (*ii*) pain at the back of the eyes; (*iii*) actual tenderness of the eyeball; (*iv*) extreme nervous prostration. Lastly, dengue can sometimes be excluded by the absence of the vector mosquito *Ædes calopus* (*Stegomyia fasciata*).

I would like to know if Dr. Thurston has not noted the above points and where his cases were seen, because it is possible, as I have stated before, that dengue is a collective term of covering our ignorance and this may explain discrepancies in the descriptions of the disease.

Yours, etc.,

BURTON BRADLEY.

Wolsley Road, Coogee, New South Wales.
March 7, 1923.

THE FELLOWSHIP OF MEDICINE.

SIR: I have just seen a copy of your journal for December last, containing Dr. Dunbar Hooper's interesting article on "Post-Graduate Work in Europe" and as in passing he makes reference to this Association, which for the past four years has endeavoured to co-ordinate post-graduate teaching in London, I would ask your kind permission to make a short reply. While thanking Dr. Dunbar Hooper for his kindly remarks, I trust he will forgive my correcting a slight error in his statement. Sir John MacAlister, though one of its original founders, is not a secretary of the Fellowship of Medicine, but is the Secretary of the Royal Society of Medicine, to which Society the Fellowship owes its being and is indebted for the hospitality whereby it is able to carry on its work. Members of the Fellowship of Medicine have always received a hearty welcome from the Royal Society of Medicine and the Secretary, Sir John MacAlister, which probably accounts for the confusion between the two bodies and I am therefore glad to have this opportunity of stating the true facts and, at the same time,

emphasizing the large part that the Royal Society of Medicine has played in the life of the Fellowship of Medicine.

Yours, etc.,

MARGARET A. WILLIS
Secretary.

1, Wimpole Street, London, W.I.
February 6, 1923.

Books Received.

PROTISTS AND DISEASE, by J. Jackson Clarke, M.B. (Lond.), F.R.C.S.; 1922. London: Baillière, Tindall and Cox; Fscp. 4to.; pp. xii. + 229, with one plate and 61 figures in the text. Price: 15s. net.

THE MALLEE FIRE AND OTHER VERSES, by Charles Henry Souter, M.B. (Aberd.); 1923. Sydney: Angus & Robertson, Limited; Crown 8vo., pp. 147. Price: 6s. net.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered under the provisions of the *Medical Act of* 1867 as duly qualified medical practitioners:

BIRCH, LOUIS, L.R.C.P. (Irel.) 1886, L.R.C.S. (Edin.) 1890, Clifton.

COOK, ERROL AUFRERE, M.B., CH.M., 1921 (Univ. Sydney), Barcaldine.

Medical Appointments.

DR. MARK C. GARDNER (B.M.A.) has been elected to the position of Honorary Attending Oculist to the recently formed Out-Patient Department at the Children's Hospital, Carlton, Victoria.

* * * *

DR. FRANK TIPPING has been appointed Government Medical Officer at Cudal, New South Wales.

* * * *

DR. J. KING PATRICK (B.M.A.) has been appointed Honorary Physician to the Anti-Tuberculosis Dispensary, Sydney.

* * * *

DR. J. B. LEWIS (B.M.A.) and DR. J. J. O'GRADY (B.M.A.) have been appointed Honorary Assistant Opthalmologists at the Adelaide Hospital, Adelaide.

* * * *

THE undermentioned appointments in the Mareeba Babies' Hospital, South Australia, have been gazetted:

DR. HELEN M. MAYO (B.M.A.), DR. H. S. COVERNTON (B.M.A.), DR. F. N. LE MESSURIER, D.S.O., (B.M.A.), and DR. C. F. PITCHER (B.M.A.), as Honorary Medical Officers; DR. R. H. PULLEINE (B.M.A.), as Honorary Consulting Oral Surgeon; DR. F. H. BEARE (B.M.A.), as Honorary Pathologist); DR. R. L. THOROLD GRANT (B.M.A.), as Honorary Assistant Pathologist; DR. HELEN M. MAYO (B.M.A.), as Honorary Medical Registrar.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii..

BENEVOLENT SOCIETY OF NEW SOUTH WALES: Junior Resident Medical Officer.

BROKEN HILL DISTRICT HOSPITAL: Surgeon Superintendent.

ROYAL PRINCE ALFRED HOSPITAL: Honorary Surgeon; Honorary Assistant Surgeons (2); Honorary Assistant Surgeons (temporary).

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

MAR. 27.—New South Wales Branch, B.M.A.: Council; Election of Officers and Appointment of Standing Committees.
MAR. 28.—Victorian Branch, B.M.A.: Council.
MAR. 29.—South Australian Branch, B.M.A.: Branch.
APR. 6.—Queensland Branch, B.M.A.: Branch.
APR. 10.—New South Wales Branch, B.M.A.: Ethics Committee.
APR. 11.—Victorian Branch, B.M.A.: Branch.
APR. 11.—Western Australian Branch, B.M.A.: Council.
APR. 11.—Melbourne Pædiatric Society.
APR. 12.—Victorian Branch, B.M.A.: Council.
APR. 13.—New South Wales Branch, B.M.A.: Clinical Meeting.
APR. 13.—Queensland Branch, B.M.A.: Branch.
APR. 13.—South Australian Branch, B.M.A.: Council.
APR. 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
APR. 18.—Western Australian Branch, B.M.A.: Branch.
APR. 20.—Eastern Suburbs Medical Association, New South Wales.
APR. 21.—Western Suburbs Medical Association, New South Wales: Annual Meeting.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)

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